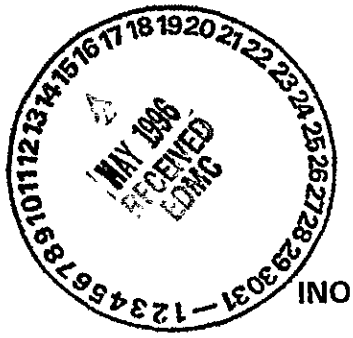
LK5106-LAS

0043954

Lockheed Analytical Services

Log-in No.: L5106
Quotation No.: Q400000-B
SAF: B95-068
Document File No.: 0811596
WHC Document File No.: 257
SDG No.: LK5106



CASE NARRATIVE
INORGANIC NON METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- One water sample was received for LK5106 and analyzed in batch 811 bh for selected analytes as requested on the chain of custody. Quality control analysis was performed on the following sample:

Client ID	LAL #		Method
BOGFD7	L5106-3	MS, DUP	300.0 Chloride, Fluoride, Nitrate-Nitrogen, Nitrite-Nitrogen, Orthophosphate, Sulfate
	L5106-6	MS, DUP	350.1 Ammonia
	L5106-4	MS, DUP	353.2 Nitrate-Nitrite-Nitrogen
	L5106-5	MS, DUP	9030 Sulfide

Holding Time Requirements

- All samples were analyzed within the method-specific holding time with the exception of Method 300.0 Nitrate-Nitrogen, Nitrite-Nitrogen and Orthophosphate which were received outside of holding time. The associated samples are flagged with an "H".

Method Blanks

- The concentration levels of all the requested analytes in the method blank were below the reporting detection limits.

Internal Quality Control

- All Internal Quality Control were within acceptance limits.

Kay McCann
Prepared By

September 12, 1995
Date

CASE NARRATIVE
INORGANIC METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- One water sample for total metals analysis. The sample was prepared as LAS Batch 811BHT and analyzed for selected analytes as requested on the chain of custody. Sample B0GFD7 (L5106-2) was used for matrix spike and duplicate and serial dilution. All data flags due to the performance of the above-mentioned QC are also associated with every sample digested with this batch.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times.

Internal Quality Control

- All internal quality control were within acceptance limits with the following exceptions:

  For lead, the LCSW (121.1%) recovered slightly above the acceptance criteria (80-120%). No lead was detected in the sample, therefore the positive bias observed does not affect the result. No corrective action was taken.

Sample Results

- The following qualifiers are reported on the basis of the techniques employed to perform the analyses:

  "P" ICP-AES

Nalini Prabhakar — 09/08/95

Prepared By — **Date**

CASE NARRATIVE
INORGANIC METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- One filtered water sample was analyzed for dissolved metals analysis. As the measured turbidity of the sample was less than 1 NTU, it was batched as LAS batch 811BHD for dissolved metals analysis. Sample B0GFD8 (L5106-13) was used for matrix spike, duplicate and serial dilution analyses. All data flags due to the performance of the above-mentioned QC sample are also associated with every sample analyzed with this batch.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times.

Method Blanks

- The level of analytes in the method blanks were less than the reporting detection limits.

Internal Quality Control

All internal quality control were within acceptance limits with the following exceptions:

- In the analysis of calcium, the percent difference of serial dilution slightly exceeded 10% the control limit. This may be due to physical interferences. Calcium results for the associated sample is flagged with an "E".

Sample Results

- The following qualifiers are reported on the basis of the techniques employed to perform the analyses:
"P" ICP-AES

Nalini Prabhakar
Prepared By

09/08/95
Date

CASE NARRATIVE
RADIOCHEMICAL ANALYSES

The routine calibration and quality control (QC) analyses performed for this batch include as applicable: instrument calibration, initial and continuing calibration verification, quench monitoring standards, instrument background analysis, method blanks, yield tracer, laboratory control samples, matrix spike samples, duplicate samples.

NOTE: Chemical recoveries and minimum detectable activities can be found on the preparation sheets and calculation sheets on the attached raw data for each method.

Holding Time Requirements

All holding times were met.

Analytical Method Gross Alpha/Beta

The gross alpha/beta analysis was performed using standard operating procedure (SOP), LAL-91-SOP-0060. The samples were analyzed in workgroup 26272. No problems were encountered during analysis and all QC criteria were met. No re-analyses were performed.

Analytical Method Strontium-90

The strontium-90 analysis was performed using SOP, LAL-91-SOP-0196. The samples were analyzed in workgroup 26273. No problems were encountered during the analysis and all QC criteria were met with the following exceptions: The relative error recovery and relative percent difference were slightly out of QC criteria. Data quality is not adversely affected. No re-analyses were performed.

Analytical Method Tritium

The tritium analysis was performed using SOP, LAL-91-SOP-0066. The samples were analyzed in workgroup 26274. No problems were encountered during analysis and all QC criteria were met. No re-analyses were performed.

Andrea Tippett
Prepared By

August 26, 1995
Date

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 11 1995, 04:16 pm

Login Number: L5106
Account: 596 Bechtel Hanford, Inc. * Richland, WA
Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number			Client Sample Number		Collect Date	Receive Date	Due PR Date
L5106-1			B0GFD7		09-AUG-95	11-AUG-95	25-SEP-95
temp 2; B95-068							
Location: 157							
Water	1	S	SCREENING		Hold:	05-FEB-96	
L5106-2			B0GFD7		09-AUG-95	11-AUG-95	25-SEP-95
temp 2; B95-068							
Location: 157							
Water	1	S	6010 ICP METALS		Hold:	05-FEB-96	
L5106-3			B0GFD7		09-AUG-95	11-AUG-95	25-SEP-95
temp 2; B95-068							
Location: 157							
Water	1	S	300.0 CHLORIDE		Hold:	06-SEP-95	
Water	1	S	300.0 FLUORIDE		Hold:	06-SEP-95	
Water	1	S	300.0 NITRATE		Hold:	11-AUG-95	
Water	1	S	300.0 NITRITE		Hold:	11-AUG-95	
Water	1	S	300.0 PHOSPHATE		Hold:	11-AUG-95	
Water	1	S	300.0 SULFATE		Hold:	06-SEP-95	
L5106-4			B0GFD7		09-AUG-95	11-AUG-95	25-SEP-95
temp 2; B95-068							
Location: 157							
Water	1	S	353.2 NITRATE		Hold:	06-SEP-95	
L5106-5			B0GFD7		09-AUG-95	11-AUG-95	25-SEP-95
temp 2; B95-068							
Location: 157							
Water	1	S	9030 SULFIDE		Hold:	16-AUG-95	
L5106-6			B0GFD7		09-AUG-95	11-AUG-95	25-SEP-95
temp 2; B95-068							
Location: 157							
Water	1	S	350.1 NH3/N		Hold:	06-SEP-95	
L5106-7			B0GFD7		09-AUG-95	11-AUG-95	25-SEP-95
temp 2; B95-068							
Location: 157							
Water	1	S	GR ALP/BETA LAL-0060		Hold:	05-FEB-96	
Water	1	S	SR-90 LAL-0196		Hold:	05-FEB-96	
L5106-8			B0GFD7		09-AUG-95	11-AUG-95	25-SEP-95
temp 2; B95-068							
Location: 157							

LOCKHEED ANALYTICAL SERVICES
LOGIN CHAIN OF CUSTODY REPORT (ln01)
Aug 11 1995, 04:16 pm

Login Number: L5106
Account: 596 Bechtel Hanford, Inc. * Richland, WA
Project: BECHTEL-HANFORD Bechtel Hanford Project

Laboratory Sample Number	Client Sample Number	Collect Date	Receive Date	PR	Due Date
L5106-9	B0GFD7	09-AUG-95	11-AUG-95		25-SEP-95
temp 2; B95-068					
Location: 157					
L5106-10	B0GFD7	09-AUG-95	11-AUG-95		25-SEP-95
temp 2; B95-068					
Location: 157					
L5106-11	B0GFD7	09-AUG-95	11-AUG-95		25-SEP-95
temp 2; B95-068					
Location: 157					
L5106-12	B0GFD7	09-AUG-95	11-AUG-95		25-SEP-95
temp 2; B95-068					
Location: 157					
Water 1 S TRITIUM(H3) LAL-0066 Hold:05-FEB-96					
L5106-13	B0GFD8	09-AUG-95	11-AUG-95		25-SEP-95
temp 2; B95-068					
Location: 157					
Filt H20 15 S 6010 ICP METALS Hold:05-FEB-96					
L5106-14	REPORT TYPE	11-AUG-95	11-AUG-95		25-SEP-95
B95-068					
Location:					
Water 1 S EDD - DISK DEL.					
Water 1 S INORG TYPE 4A RPT					
Water 1 S RAD RPT TYPE 4F					

Signature: [signature]
Date: 8-11-95

0014

0811590

Bechtel Hanford, Inc.	L5106 CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	Page 1 of 1

Data Turnaround: ☐ Priority ■ Normal

Collector: K. D. Lee	Company Contact: R. E. Peterson	Telephone: (509) 372-9638
Project Designation: 100-HR-3 Groundwater Sampling, Round 9, Phase 2	Sampling Location: 100 D	SAF No.: B95-068
Ice Chest No.: PATTON	Field Logbook No.: EFL-1018	Method of Shipment: Federal Express
Shipped To: Lockheed	Offsite Property No.: ~~NA~~ W95-0-0209-46	Bill of Lading/Air Bill No.: ~~NA~~ 2904637303

Possible Sample Hazards/Remarks:

Special Handling and/or Storage: Maintain samples between 2°C and 6°C.

Preservation	HNO_3	Cool 4°C	H_2SO_4	*1	H_2SO_4	HNO_3	Cool 4°C	Cool 4°C		HNO_3
Type of Container	G	G	P/G	P	P/G	P/G	G	P/G		G
No. of Container(s)	1	1	1	1	1	5	1	1		1
Volume	500mL	500mL	500mL	1L	1L	1L	500mL	20mL		500mL
SAMPLE ANALYSIS	ICP Metals (Unfiltered)	Anions (IC) - F, Cl, SO_4, NO_2, NO_3, PO_4	NO_2 - NO_3	Sulfide	Ammonia	Gross Alpha, Gross Beta, Sr-90	Tritium	Activity Scan		ICP Metals (Filtered)

Sample No.	Matrix*	Date Sampled	Time Sampled	ICP Metals (Unfiltered)	Anions	NO_2-NO_3	Sulfide	Ammonia	Gross Alpha/Beta, Sr-90	Tritium	Activity Scan		ICP Metals (Filtered)
B0GFD7	W	8/9/95	1135	X	X	X	X	X	X	X	X		
B0GFD8	W	8/9/95	1135										X

CHAIN OF POSSESSION — Sign/Print Names

Relinquished By	Date/Time	Received By	Date/Time
K D Lee	8/10/95 0730	B. Whitten (ERC)	8-10-95 0730
B. Whitten (ERC)	8-10-95 0830		

SPECIAL INSTRUCTIONS

*1 ZnAc+NaOH

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0; and turbidity by EPA 180.1 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all samples listed on this chain of custody.

Matrix*: S = Soil; SE = Sediment; SO = Solid; SL = Sludge; W = Water; O = Oil; A = Air; DS = Drum Solids; DL = Drum Liquids; T = Tissue; WI = Wipe; L = Liquid; V = Vegetation; X = Other

LABORATORY SECTION	Received By: A. Miller	Title: Sample Custodian	Date/Time: 8-11-95 0910
FINAL SAMPLE DISPOSITION	Disposal Method:	Disposed By:	Date/Time:

9513.0031

24616

SAMPLE CHECK-IN LIST

Date/Time Received: 8-11-95/0920 SDG#: N/A

Work Order Number: N/A SAF #: B95-C698

Shipping Container ID: Porter Chain of Custody # N/A

1. Custody Seals on shipping container intact? Yes [X] No [ ]
2. Custody Seals dated and signed? Yes [X] No [ ]
3. Sample temperature 2°C
4. Vermiculite/packing materials is Wet [ ] Dry [X]
5. Each sample is in a plastic bag? Yes [X] No [ ]
6. Sample holding times exceeded? Yes [ ] No [X]

7. Samples have:
   ____ tape ____ hazard labels
   X custody seals X appropriate sample labels

8. Samples are:
   Y in good condition ____ leaking
   ____ broken ____ have air bubbles

9. Is the information on the COC and Sample bottles in agreement?
   Yes [X] No [ ]

Notes: _____

Sample Custodian/Laboratory: [illegible] Date: 8-11-95

Telephoned To: Kathleen Hall On 8-11-95 By Anthony Miller

0018

C5/1596

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0GFD7	Date Collected: 09-AUG-95
Matrix: Water	Date Received: 11-AUG-95
Percent Solids: N/A	

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch ID	LAS Sample ID
Chloride	mg/L	300.0	27.	0.020		14-AUG-95	26209	L5106-3
Fluoride	mg/L	300.0	< 0.001	0.10	U	05-SEP-95	26210	L5106-3
Nitrate-N	mg/L	300.0	35.	0.020	H	14-AUG-95	26211	L5106-3
Nitrite-N	mg/L	300.0	< 0.002	0.010	HU	14-AUG-95	26212	L5106-3
Ortho Phosphate	mg/L	300.0	< 0.020	0.10	HU	14-AUG-95	26213	L5106-3
Sulfate	mg/L	300.0	130	0.10		14-AUG-95	26214	L5106-3
Ammonia Nitrogen	mg/L	350.1	0.46	0.050		16-AUG-95	26215	L5106-6
Nitrate-Nitrite-Nitrogen	mg/L	353.2	35.	0.50	D(1:10)	18-AUG-95	26217	L5106-4
Sulfide	mg/L	9030	< 1.0	3.0	U	15-AUG-95	26249	L5106-5

SW - 846

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0GFD7

Lab Name: L.A.S Contract: HANFORD

Lab Code: LOCK Case No.: B95-06 SAS No.: SDG No.: L5106W

Matrix (soil/water): WATER Lab Sample ID: L5106-2

Level (low/med): LOW Date Received: 08/11/95

% Solids: 0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	29.0	U		P
7440-36-0	Antimony	58.0	U		P
7440-38-2	Arsenic	98.0	U		P
7440-39-3	Barium	146	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	122000			P
7440-47-3	Chromium	170			P
7440-48-4	Cobalt	6.0	U		P
7440-50-8	Copper	3.0	U		P
7439-89-6	Iron	105			P
7439-92-1	Lead	56.0	U		P
7439-95-4	Magnesium	12400			P
7439-96-5	Manganese	2.0	U		P
7440-02-0	Nickel	15.0	U		P
7440-09-7	Potassium	7850			P
7782-49-2	Selenium	87.0	U		P
7440-22-4	Silver	4.0	U		P
7440-23-5	Sodium	8220			P
7440-28-0	Thallium	50.0	U		P
7440-62-2	Vanadium	4.0	U		P
7440-66-6	Zinc	7.8	B		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

SW - 846

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.

B0GFD8

Lab Name: L.A.S Contract: HANFORD

Lab Code: LOCK Case No.: B95-06 SAS No.: SDG No.: L5106F

Matrix (soil/water): WATER Lab Sample ID: L5106-13

Level (low/med): LOW Date Received: 08/11/95

% Solids: 0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	30.3	B		P
7440-36-0	Antimony	58.0	U		P
7440-38-2	Arsenic	98.0	U		P
7440-39-3	Barium	141	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	124000		E	P
7440-47-3	Chromium	158			P
7440-48-4	Cobalt	6.0	U		P
7440-50-8	Copper	3.0	U		P
7439-89-6	Iron	12.0	U		P
7439-92-1	Lead	65.0	B		P
7439-95-4	Magnesium	12200			P
7439-96-5	Manganese	2.0	U		P
7440-02-0	Nickel	15.0	U		P
7440-09-7	Potassium	7580			P
7782-49-2	Selenium	87.0	U		P
7440-22-4	Silver	4.0	U		P
7440-23-5	Sodium	7800			P
7440-28-0	Thallium	109	B		P
7440-62-2	Vanadium	5.3	B		P
7440-66-6	Zinc	8.7	B		P

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0GFD7 LAL Sample ID: L5106-7

Date Collected: 09-AUG-95 Date Received: 11-AUG-95

Matrix: Water Login Number: L5106

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Gross Alpha	23-AUG-95	GR ALP/BETA LAL-0060_26272	3.7	2.6	3.5	C	pCi/L
Gross Beta	23-AUG-95	GR ALP/BETA LAL-0060_26272	11.3	2.7	3.4		pCi/L
Total radio-strontium	18-AUG-95	SR-90 LAL-0196_26273	4.37	0.63	0.72		pCi/L

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0GFD7 LAL Sample ID: L5106-12

Date Collected: 09-AUG-95 Date Received: 11-AUG-95

Matrix: Water Login Number: L5106

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
H-3	24-AUG-95	TRITIUM(H3) LAL-0066_26274	3680	480	270		pCi/L

Los Alamos Technical Associates, Inc.

8633 Gage Blvd. / Kennewick, WA 99336 / Telephone (509) 783-4369 / FAX (509) 783-9661

November 10, 1995
LATA95-217

Ms. Joan Kessner
Bechtel
1022 Lee Boulevard
Richland, WA 99352

Subject: VB404.05, SDG LK5106-LAS

Dear Ms. Kessner:

Attached is the data validation report for analytical results for 100-HR-3 Groundwater Round 9 - Phase II, (SDG LK5106-LAS). The package was received by Los Alamos Technical Associates on October 12, 1995. This data package was initially placed on hold October 17, 1995 to request missing information deemed necessary to the validation effort. The final information request was closed on October 31, 1995 placing the package back in active status.

If you have any questions, please feel free to contact me.

Sincerely,

Brent Mouck for

Marsha C. Webb
Deputy Project Manager

Attachment

cc: Jeanette Duncan, CH2M Hill
Don Smith, LATA
VB404.05
MCW/lb

ln

DATA VALIDATION REPORT
for
100-HR-3 GROUNDWATER ROUND 9
PHASE II
Metals Analysis
SDG LK5106-LAS
LATA VB404.05

Bechtel Hanford Inc.
P.O. Box 969
Richland, Washington

November 10, 1995

Table of Contents

100-HR-3 GROUNDWATER ROUND 9 PHASE II
Data Validation Narrative

INTRODUCTION

All samples in Sample Delivery Group (SDG) LK5106-LAS (VB404.05) were validated at level D as defined in the Data Validation Procedures for Chemical Analysis (WHC-SD-EN-SPP-002, Rev. 2).

The analyses were performed by Lockheed Analytical Services.

ANALYSES REQUESTED

See Table 1.

DATA QUALITY OBJECTIVES

Precision:	Goals for precision were met with the exception of those items discussed in the **"Qualification Summary Table"**.
Accuracy:	Goals for accuracy were met with the exception of those items discussed in the **"Qualification Summary Table"**.
Sample Result Verification:	All sample results were supported in the raw data.
Detection Limits:	Detection limit goals were met for all sample results as specified in the *RCRA Facility Investigation/Corrective Measures Study Work Plan for the 100-HR-3 Operable Unit*, DOE/RL-88-36, Rev. 0, with the exception of arsenic, lead, selenium and thallium.
Completeness:	The data package was 100% complete for all requested analyses.

MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

MINOR DEFICIENCIES

Minor deficiencies were identified during validation which required qualification of data as estimated. See the **"Qualification Summary Table"**.

Table 1
Chain-of-Custody
Analysis Request

LATA ID #: VB404.05 SDG: LK5106-LAS

Sample Information					Analyses Requested	
SAMPLE NO.	DATE COLLECTED	MATRIX	SAF	FIELD QC INFO	1	2
B0GFD7	9-Aug-95	WATER	B95-068	Split of B0GFB1	X	
B0GFD8	9-Aug-95	WATER	B95-068	Split of B0GFB2		X

Method References:

	Analysis	Method
1.	ICP Metals (Unfiltered)	6010
2.	ICP Metals (Filtered)	6010

REFERENCES

WHC 1993, *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

DOE 1992, *RCRA Facility Investigation/Corrective Measures Study Work Plan for the 100-HR-3 Operable Unit,* DOE/RL-88-36, Rev. 0, Department of Energy-Hanford, Richland, Washington.

GLOSSARY OF VALIDATION APPLIED QUALIFIERS (CHEMISTRY)

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows.

U- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during data validation, the associated quantitation limit is an estimate.

J- Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision making purposes.

BJ- Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R- Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency the data are unusable.

UR- Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data are unusable due to an identified QC deficiency.

GLOSSARY OF LABORATORY APPLIED QUALIFIERS

Qualifiers which may be applied by the laboratory in compliance with applicable requirements are as follows.

Commonly used laboratory metals (inorganic) qualifiers:

U- Indicates the analyte was analyzed for but not detected in the sample.

B- Indicates the analyte concentration is less than the CRDL but greater than the IDL.

E- Indicates the value reported is estimated due to the presence of interference.

M- Indicates duplicate injection precision criteria were not met during graphite furnace (GFAA) analysis.

N- Indicates spiked sample recovery was not within the control limits.

S- Indicates the reported value was determined by the Method of Standard Additions (MSA).

W- Indicates post-digestion spike for GFAA analysis is outside control limits and the sample absorbance is less than 50% of the spike absorbance.

*- Indicates duplicate analysis was not within control limits.

+- Indicates the correlation coefficient (r) for the MSA was less than 0.995.

Qualification Summary Table

Qualification Summary Table

Inorganics (Metals)

ANALYTE	TYPE	QUALIFIER	SAMPLES AFFECTED	DQO	REASON
Thallium	MINOR	UJ	B0GFD7	BLANKS	Preparation blank value is negative and outside acceptance criteria.
Thallium	MINOR	BJ	B0GFD8	BLANKS	Preparation blank value is negative and outside acceptance criteria.
Iron	MINOR	U	B0GFD7	BLANKS	Calibration blank value is positive and outside acceptance criteria.
Silver	MINOR	UJ	B0GFD7 B0GFD8	BLANKS	Preparation blank value is negative and outside acceptance criteria.
Thallium	MINOR	U	B0GFD8	BLANKS	Calibration blank value is positive and outside acceptance criteria.
Aluminum	MINOR	BJ/UJ	B0GFD7 B0GFD8	ACCURACY	No matrix spike analysis completed.
Calcium	MINOR	J	B0GFD7 B0GFD8	ACCURACY	No matrix spike analysis completed.
Iron	MINOR	J/UJ	B0GFD7 B0GFD8	ACCURACY	No matrix spike analysis completed.
Magnesium	MINOR	J	B0GFD7 B0GFD8	ACCURACY	No matrix spike analysis completed.
Potassium	MINOR	J	B0GFD7 B0GFD8	ACCURACY	No matrix spike analysis completed.
Sodium	MINOR	J	B0GFD7 B0GFD8	ACCURACY	No matrix spike analysis completed.
Calcium	MINOR	J	B0GFD8	PRECISION	Serial dilution percent difference is outside acceptance criteria and the sample results are greater than 50 times the instrument detection limit.

Comments:

1. The field split RPD values will be evaluated in SDG # W0663-QES, LATA ID VB404.07.

Data Summary Table

METALS
DATA SUMMARY TABLE

LATA ID#: VB404.05		HEIS #:	B0GFD7		B0GFD8	
		Date:	9-Aug-95		9-Aug-95	
		Matrix:	WATER		WATER	
Constituent	CAS #	Units	Results	Q	Results	Q
Aluminum	7429-90-5	ug/L	29.0	UJ	30.3	BJ
Antimony	7440-36-0	ug/L	58.0	U	58.0	U
Arsenic	7440-38-2	ug/L	98.0	U	98.0	U
Barium	7440-39-3	ug/L	146	B	141	B
Beryllium	7440-41-7	ug/L	1.0	U	1.0	U
Cadmium	7440-43-9	ug/L	5.0	U	5.0	U
Calcium	7440-70-2	ug/L	122000	J	124000	J
Chromium	7440-47-3	ug/L	170		158	
Cobalt	7440-48-4	ug/L	6.0	U	6.0	U
Copper	7440-50-8	ug/L	3.0	U	3.0	U
Iron	7439-89-6	ug/L	105	UJ	12.0	UJ
Lead	7439-92-1	ug/L	56.0	U	65.0	B
Magnesium	7439-95-4	ug/L	12400	J	12200	J
Manganese	7439-96-5	ug/L	2.0	U	2.0	U
Nickel	7440-02-0	ug/L	15.0	U	15.0	U
Potassium	7440-09-7	ug/L	7850	J	7580	J
Selenium	7782-49-2	ug/L	87.0	U	87.0	U
Silver	7440-22-4	ug/L	4.0	UJ	4.0	UJ
Sodium	7440-23-5	ug/L	8220	J	7800	J
Thallium	7440-28-0	ug/L	50.0	UJ	109	UJ
Vanadium	7440-62-2	ug/L	4.0	U	5.3	B
Zinc	7440-66-6	ug/L	7.8	B	8.7	B

Shaded areas indicate changes by the validator.

Sample Results (Form I's)

SW - 846

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0GFD7

Lab Name: L.A.S Contract: HANFORD

Lab Code: LOCK Case No.: B95-06 SAS No.: _____ SDG No.: L5106W

Matrix (soil/water): WATER Lab Sample ID: L5106-2

Level (low/med): LOW Date Received: 08/11/95

% Solids: 0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	29.0	U		P	UJ
7440-36-0	Antimony	58.0	U		P	
7440-38-2	Arsenic	98.0	U		P	
7440-39-3	Barium	146	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	5.0	U		P	
7440-70-2	Calcium	122000			P	J
7440-47-3	Chromium	170			P	
7440-48-4	Cobalt	6.0	U		P	
7440-50-8	Copper	3.0	U		P	
7439-89-6	Iron	105			P	UJ
7439-92-1	Lead	56.0	U		P	
7439-95-4	Magnesium	12400			P	J
7439-96-5	Manganese	2.0	U		P	
7440-02-0	Nickel	15.0	U		P	
7440-09-7	Potassium	7850			P	J BM 11-9-95
7782-49-2	Selenium	87.0	U		P	
7440-22-4	Silver	4.0	U		P	UJ
7440-23-5	Sodium	8220			P	J
7440-28-0	Thallium	50.0	U		P	HR UJ BM 11-22-95
7440-62-2	Vanadium	4.0	U		P	
7440-66-6	Zinc	7.8	B		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture: _____

Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:

FORM I - IN

bjs 11-2-95

SW - 846

1

INORGANIC ANALYSES DATA SHEET

CLIENT ID NO.: B0GFD8

Lab Name: L.A.S Contract: HANFORD

Lab Code: LOCK Case No.: B95-06 SAS No.: SDG No.: L5106F

Matrix (soil/water): WATER Lab Sample ID: L5106-13

Level (low/med): LOW Date Received: 08/11/95

% Solids: 0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	30.3	B		P	BJ
7440-36-0	Antimony	58.0	U		P	
7440-38-2	Arsenic	98.0	U		P	
7440-39-3	Barium	141	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	5.0	U		P	
7440-70-2	Calcium	124000		E	P	J
7440-47-3	Chromium	158			P	
7440-48-4	Cobalt	6.0	U		P	
7440-50-8	Copper	3.0	U		P	
7439-89-6	Iron	12.0	U		P	UJ
7439-92-1	Lead	65.0	B		P	
7439-95-4	Magnesium	12200			P	J
7439-96-5	Manganese	2.0	U		P	
7440-02-0	Nickel	15.0	U		P	
7440-09-7	Potassium	7580			P	J
7782-49-2	Selenium	87.0	U		P	
7440-22-4	Silver	4.0	U		P	UJ
7440-23-5	Sodium	7800			P	J
7440-28-0	Thallium	109	B		P	UJ
7440-62-2	Vanadium	5.3	B		P	
7440-66-6	Zinc	8.7	B		P	

BM 11-9-95

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

FORM I - IN

BJ 11-2-95

0240

Checklist

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

VALIDATION PROCEDURE: [ ] WHC-CM-5-3, Rev. 0 [X] WHC-SD-EN-SPP-002, Rev. 2

PROJECT:	100-HR-3 ROUND 9	SDG:	LK5106-LAS		
VALIDATOR:	D.E. STROUP 11-9-95	LATA NO:	VB404.05	DATE:	27-Oct-95
REVIEWER:	B MORRIS 11.9.95	LAB:	LAS	CASE:	N/A
SAF NO:	B95-068	QAPP NO:	DOE/RL-88-36, Rev. 0	SAP NO:	N/A

ANALYSES REQUESTED

[X] ICP Metals Unfiltered 6010		[X] ICP Metals Filtered 6010		COMMENTS
SAMPLE NO.	MATRIX	SAMPLE NO.	MATRIX	
B0GFD7	WATER	B0GFD8	WATER	

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

	YES	NO	N/A
Is technical verification documentation present?	X		
Is a case narrative present?	X		

2. HOLDING TIMES

	YES	NO	N/A
Are sample holding times acceptable?	X		

See HOLDING TIME SUMMARY form

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

	YES	NO	N/A
Were initial calibrations performed on all instruments?	X		
Are initial calibrations acceptable?	X		
Are ICP interference checks acceptable?	X		
Were ICV and CCV checks performed on all instruments?	X		
Are ICV and CCV checks acceptable?	X		
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see CALIBRATION DATA SUMMARY form

4. BLANKS

	YES	NO	N/A
Were ICB and CCB checks performed for all applicable analyses?	X		
Are ICB and CCB results acceptable?		X	
Were preparation blanks analyzed?	X		
Are preparation blank results acceptable?		X	

If NO(s) are checked, see BLANK AND SAMPLE DATA SUMMARY form

5. ACCURACY

	YES	NO	N/A
Were spike samples analyzed at the proper frequency?		X	
Are all spike sample recoveries acceptable?	X		
Are all elements spiked at an appropriate level?	X		
Was a post digestion spike analyzed?			X
Are all post digestion spike recoveries acceptable?			X
Were laboratory control samples (LCS) analyzed at the proper frequency?	X		
Are all LCS recoveries acceptable?	X		
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see ACCURACY DATA SUMMARY form

6. PRECISION

	YES	NO	N/A
Were laboratory duplicates analyzed at the proper frequency?	X		
Are all duplicate RPD values acceptable?	X		
Were MS/MSDs analyzed?			X
Are all MS/MSD RPD values acceptable?			X
Were ICP serial dilution samples analyzed at the proper frequency?	X		
Are all ICP serial dilution %D values acceptable?		X	
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see PRECISION DATA SUMMARY form

7. FIELD QC SAMPLES

	YES	NO	N/A
Were field QC samples (field/trip blanks, duplicates, splits, performance audit) identified?	X		
Are field/trip blank results acceptable? (see Blank Data Summary form)			X
Are field duplicate RPD values acceptable? (see Field QC evaluation)			X
Are field split RPD values acceptable? (see Field QC evaluation)			X
Are performance audit sample results acceptable?			X

Comments:

Split analysis results reported in SDG W0663-QES (VB404.07).

8. FURNACE AA QUALITY CONTROL

	YES	NO	N/A
Were duplicate injections required?			X
Are all duplicate injection %RSD values acceptable?			X
Were analytical spikes required?			X
Are all analytical spike recoveries acceptable?			X
Was MSA required?			X
Are all MSA results acceptable?			X
Validation calculation checks were performed and are acceptable.			X

Comments:

9. REPORTED RESULTS AND DETECTION LIMITS

	YES	NO	N/A
Are results reported for all requested analyses?	X		
Are all results supported in the raw data?	X		
Are results calculated properly?	X		
Do results meet the CRDLs?	X		
Validation calculation checks were performed and are acceptable.	X		

Comments:

VALIDATION SUMMARY

For deficiencies (major and minor) and comments, please refer to the Qualification Summary Table.

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

HOLDING TIME SUMMARY

SDG:	LK5106-LAS		VALIDATOR: D.E. STROUP					DATE:	27-Oct-95	
PROJECT:	100-HR-3 ROUND 9		REVIEWER: B MORRIS					LATA NO.:	VB404.05	
HEIS-SN	MATRIX CODE	ANALYSIS	DATE COLLECTED	PREP DATE	ANALYSIS DATE	PREP HT (days)	*Required HT (days)*	ANALYSIS HT (days)	*Required HT (days)*	VAL Q
B0GFD7	WATER	ICP Metals - Filtered	9-Aug-95	N/A	30-Aug-95	N/A	*N/A*	21	*180*	NONE
B0GFD8	WATER	ICP Metals - Unfiltered	9-Aug-95	N/A	25-Aug-95	N/A	*N/A*	16	*180*	NONE

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

BLANK DATA SUMMARY

SDG:	LK5106-LAS		VALIDATOR:	D.E. STROUP					DATE:	27-Oct-95
PROJECT:	100-HR-3 ROUND 9		REVIEWER:	B MORRIS					LATA NO.:	VB404.05
BLANK ID	ANALYTE	RESULT	LAB Q	RT	UNITS	2X RESULT	5X RESULT	10X RESULT	SAMPLES AFFECTED	VAL Q
Prep Blank	Thallium	-60.770	B	NA	ug/L			607.7	B0GFD7 B0GFD8	BJ/UJ
Cal Blank	Iron	25.3	B	NA	ug/L		126.5		B0GFD7	U
Prep Blank	Silver	-5.290	B	NA	ug/L			52.9	B0GFD7 B0GFD8	UJ
Cal Blank	Thallium	64.4	B	NA	ug/L		322		B0GFD8	U

BLANKS

Lab Name: L.A.S_____ Contract: HANFORD___

Lab Code: LOCK__ Case No.: B95-06 SAS No.: _____ SDG No.: L5106F

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	29.0	U	29.0	U	29.0	U	29.0	U	29.000	U	P
Antimony	58.0	U	58.0	U	58.0	U	58.0	U	58.000	U	P
Arsenic	98.0	U	98.0	U	98.0	U	98.0	U	98.000	U	P
Barium	21.0	U	21.0	U	21.0	U	21.0	U	21.000	U	P
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	P
Cadmium	5.0	U	5.0	U	5.0	U	5.0	U	5.000	U	P
Calcium	32.0	U	32.0	U	32.0	U	32.0	U	32.000	U	P
Chromium	3.0	U	3.0	U	3.0	U	3.0	U	3.000	U	P
Cobalt	6.0	U	6.0	U	6.0	U	6.0	U	6.000	U	P
Copper	3.0	U	3.0	U	3.0	U	3.0	U	3.000	U	P
Iron	12.0	U	12.0	U	12.0	U	12.0	U	12.000	U	P
Lead	56.0	U	56.0	U	56.0	U	56.0	U	56.000	U	P
Magnesium	50.0	U	50.0	U	50.0	U	50.0	U	50.000	U	P
Manganese	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	P
Nickel	15.0	U	15.0	U	15.0	U	15.0	U	15.000	U	P
Potassium	600.0	U	600.0	U	600.0	U	600.0	U	600.000	U	P
Selenium	87.0	U	87.0	U	87.0	U	87.0	U	87.000	U	P
Silver	4.0	U	4.0	U	4.0	U	4.0	U	-5.290	B	P
Sodium	70.0	U	70.0	U	70.0	U	70.0	U	70.000	U	P
Thallium	50.0	U	50.0	U	55.9	B	64.4	B	50.000	U	P
Vanadium	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	P
Zinc	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	P

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3
BLANKS

Lab Name: L.A.S_____ Contract: HANFORD___

Lab Code: LOCK__ Case No.: B95-06 SAS No.: _____ SDG No.: L5106W

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	29.0	U	29.0	U	29.0	U	29.0	U	29.000	U	P
Antimony	58.0	U	58.0	U	58.0	U	58.0	U	58.000	U	P
Arsenic	98.0	U	98.0	U	98.0	U	98.0	U	98.000	U	P
Barium	21.0	U	21.0	U	21.0	U	21.0	U	21.000	U	P
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	P
Cadmium	5.0	U	5.0	U	5.0	U	5.0	U	5.000	U	P
Calcium	32.0	U	32.0	U	32.0	U	32.0	U	32.000	U	P
Chromium	3.0	U	3.0	U	5.4	B	8.2	B	3.000	U	P
Cobalt	6.0	U	6.0	U	6.0	U	7.5	B	6.000	U	P
Copper	3.0	U	3.0	U	3.0	U	7.9	B	3.000	U	P
Iron	12.0	U	12.0	U	13.8	B	25.3	B	12.000	U	P
Lead	56.0	U	56.0	U	56.0	U	56.0	U	56.000	U	P
Magnesium	50.0	U	50.0	U	50.0	U	50.0	U	50.000	U	P
Manganese	2.0	U	2.0	U	2.5	B	7.0	B	2.000	U	P
Nickel	15.0	U	15.0	U	15.0	U	15.0	U	15.000	U	P
Potassium	600.0	U	600.0	U	600.0	U	600.0	U	600.000	U	P
Selenium	87.0	U	87.0	U	87.0	U	87.0	U	87.000	U	P
Silver	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	P
Sodium	70.0	U	70.0	U	70.0	U	70.0	U	71.010	B	P
Thallium	-71.3	B	50.0	U	-100.8	B	-149.9	B	-60.770	B	P
Vanadium	4.0	U	4.0	U	4.0	U	8.9	B	4.000	U	P
Zinc	4.0	U	4.0	U	4.0	U	5.1	B	7.290	B	P

bjs 11-2-95

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LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

ACCURACY DATA SUMMARY

SDG: LK5106-LAS				VALIDATOR: D.E. STROUP				DATE: 27-Oct-95		
PROJECT: 100-HR-3 ROUND 9				REVIEWER: B MORRIS				LATA NO.: VB404.05		
						PERCENT RECOVERY (%R)				
HEIS-SN	ANALYTE	Lab Q	Actual Spiking Level	Minimum Required Spiking Level	Difference	Matrix Spike	Matrix Spike Duplicate	Laboratory Control Standard	SAMPLES AFFECTED	VAL Q
B0GFD7 B0GFD8	Aluminum	NO MATRIX SPIKE ANALYSIS							B0GFD7/B0GFD8	UJ/BJ
B0GFD7 B0GFD8	Calcium	NO MATRIX SPIKE ANALYSIS							B0GFD7/B0GFD8	J
B0GFD7 B0GFD8	Iron	NO MATRIX SPIKE ANALYSIS							B0GFD7/B0GFD8	J/UJ
B0GFD7 B0GFD8	Magnesium	NO MATRIX SPIKE ANALYSIS							B0GFD7/B0GFD8	J
B0GFD7 B0GFD8	Potassium	NO MATRIX SPIKE ANALYSIS							B0GFD7/B0GFD8	J
B0GFD7 B0GFD8	Sodium	NO MATRIX SPIKE ANALYSIS							B0GFD7/B0GFD8	J

SW - 846

5A
SPIKE SAMPLE RECOVERY

CLIENT ID NO.

B0GFD7S

Lab Name: L.A.S Contract: HANFORD

Lab Code: LOCK Case No.: B95-06 SAS No.: SDG No.: L5106W

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	2049.4400		58.0000	U	2000.00	102.5		P
Arsenic	75-125	2122.7300		98.0000	U	2000.00	106.1		P
Barium	75-125	2186.7600		145.8600	B	2000.00	102.0		P
Beryllium	75-125	46.6200		1.0000	U	50.00	93.2		P
Cadmium	75-125	48.4200		5.0000	U	50.00	96.8		P
Calcium									NR
Chromium	75-125	377.1800		169.6500		200.00	103.8		P
Cobalt	75-125	514.9600		6.0000	U	500.00	103.0		P
Copper	75-125	257.4300		3.0000	U	250.00	103.0		P
Iron									NR
Lead	75-125	540.7700		56.0000	U	500.00	108.2		P
Magnesium									NR
Manganese	75-125	523.0300		2.0000	U	500.00	104.6		P
Nickel	75-125	533.6500		15.0000	U	500.00	106.7		P
Potassium									NR
Selenium	75-125	2149.0300		87.0000	U	2000.00	107.5		P
Silver	75-125	50.9100		4.0000	U	50.00	101.8		P
Sodium									NR
Thallium	75-125	1843.2200		50.0000	U	2000.00	92.2		P
Vanadium	75-125	525.9500		4.0000	U	500.00	105.2		P
Zinc	75-125	543.1400		7.7500	B	500.00	107.1		P

Comments:

FORM V (Part 1) - IN

DLS 10-19-95

SW - 846

5A
SPIKE SAMPLE RECOVERY

CLIENT ID NO.: B0GFD8S

Lab Name: L.A.S Contract: HANFORD

Lab Code: LOCK Case No.: B95-06 SAS No.: SDG No.: L5106F

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	2032.9800		58.0000	U	2000.00	101.6		P
Arsenic	75-125	2180.2300		98.0000	U	2000.00	109.0		P
Barium	75-125	2213.3500		141.1500	B	2000.00	103.6		P
Beryllium	75-125	47.8400		1.0000	U	50.00	95.7		P
Cadmium	75-125	47.2900		5.0000	U	50.00	94.6		P
Calcium									NR
Chromium	75-125	373.1900		158.1700		200.00	107.5		P
Cobalt	75-125	531.6500		6.0000	U	500.00	106.3		P
Copper	75-125	252.6500		3.0000	U	250.00	101.1		P
Iron									NR
Lead	75-125	528.2700		65.0100	B	500.00	92.7		P
Magnesium									NR
Manganese	75-125	528.9500		2.0000	U	500.00	105.8		P
Nickel	75-125	535.1800		15.0000	U	500.00	107.0		P
Potassium									NR
Selenium	75-125	2233.3600		87.0000	U	2000.00	111.7		P
Silver	75-125	50.8900		4.0000	U	50.00	101.8		P
Sodium									NR
Thallium	75-125	2076.5200		109.4400	B	2000.00	98.4		P
Vanadium	75-125	532.8000		5.3400	B	500.00	105.5		P
Zinc	75-125	541.7800		8.7400	B	500.00	106.6		P

Comments:

FORM V (Part 1) - IN

10-19-95

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

PRECISION DATA SUMMARY

SDG: LK5106-LAS					VALIDATOR: D.E. STROUP								DATE: 27-Oct-95		
PROJECT: 100-HR-3 ROUND 9					REVIEWER: B MORRIS								LATA NO.: VB404.05		
HEIS-SN	ANALYTE	RESULTS	LAB Q	IDL µg/L	10*IDL µg/L	50*IDL µg/L	SERIAL DIL %D	CRDL µg/L	2 CRDL mg/Kg	5 CRDL mg/Kg	DUPE RPD %	DUPE CRDL dif	MS/MSD RPD	SAMPLES AFFECTED	VAL Q
B0GFD8L	Calcium	124000		32	NA	1600	10.7%	5000	NA	NA	NA	NA	NA	B0GFD8	J

000025

9

ICP SERIAL DILUTION

CLIENT ID NO.: B0GFD8 L

Lab Name: L.A.S Contract: HANFORD

Lab Code: LOCK Case No.: B95-06 SAS No.: SDG No.: L5106F

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	30.31	B	145.00	U	100.0		P
Antimony	58.00	U	290.00	U			P
Arsenic	98.00	U	490.00	U			P
Barium	141.15	B	139.93	B	0.9		P
Beryllium	1.00	U	5.00	U			P
Cadmium	5.00	U	25.00	U			P
Calcium	124216.59		110899.94		10.7	E	P
Chromium	158.17		148.13		6.3		P
Cobalt	6.00	U	30.00	U			P
Copper	3.00	U	15.00	U			P
Iron	12.00	U	60.00	U			P
Lead	65.01	B	280.00	U	100.0		P
Magnesium	12164.32		11577.05	B	4.8		P
Manganese	2.00	U	10.00	U			P
Nickel	15.00	U	75.00	U			P
Potassium	7581.24		5379.88	B	29.0		P
Selenium	87.00	U	435.00	U			P
Silver	4.00	U	20.00	U			P
Sodium	7803.88		7783.74	B	0.3		P
Thallium	109.44	B	250.00	U	100.0		P
Vanadium	5.34	B	20.00	U	100.0		P
Zinc	8.74	B	26.88	B	207.6		P

BM 11-9-95

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

PERCENT RECOVERY (ICV/CCV)

SDG: LK5106-LAS

Date: 27-Oct-95

LATA No.: VB404.05

Validator: D.E. STROUP

Analyte	ICV/CCV ID	Observed Value	True Value	%R
		O	A	
Calcium (B0GFD7)	ICV	102257.50	100000.00	102.3%
Zinc (B0GFD7)	ICV	10030.22	10000.00	100.3%
Calcium (B0GFD7)	CCV2	26569.31	25000.00	106.3%
Zinc (B0GFD7)	CCV2	10688.70	10000.00	106.9%
Calcium (B0GFD8)	ICV	103171.80	100000.00	103.2%
Zinc (B0GFD8)	ICV	9951.67	10000.00	99.5%
Calcium (B0GFD8)	CCV2	25108.09	25000.00	100.4%
Zinc (B0GFD8)	CCV2	10139.25	10000.00	101.4%

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

MATRIX SPIKE RECOVERY (MS)

SDG: LK5106-LAS Date: 27-Oct-95

LATA No.: VB404.05 Validator: D.E. STROUP

Analyte	Sample ID	Spike Sample Result	Sample Result	Spike Added	%R
		SSR	SR	SA	
Antimony	B0GFD7S	2049.44	0.00	2000.00	102.5%
Cobalt	B0GFD7S	514.96	0.00	500.00	103.0%
Antimony	B0GFD8S	2032.98	0.00	2000.00	101.6%
Cobalt	B0GFD8S	531.65	0.00	500.00	106.3%

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

PERCENT RECOVERY (LCS)

SDG: LK5106-LAS Date: 27-Oct-95

LATA No.: VB404.05 Validator: D.E. STROUP

Analyte	Observed value	True value	%R
	OLCS	ALCS	
Aluminum	1971.15	2000.00	98.6%
Silver	45.51	50.00	91.0%

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

RELATIVE PERCENT DIFFERENCE

SDG: LK5106-LAS

Date: 27-Oct-95

LATA No.: VB404.05

Validator: D.E. STROUP

Analyte	Sample ID	Original (Sample) concentration	Duplicate concentration	RPD
		OS	D	
Barium	B0GFD7D	145.86	145.65	0.1%
Zinc	B0GFD7D	7.75	12.42	46.3%
Barium	B0GFD8D	141.15	142.52	1.0%
Zinc	B0GFD8D	8.74	9.02	3.2%

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

PERCENT DIFFERENCE (ICP SERIAL DILUTION)

SDG: LK5106-LAS

Date: 27-Oct-95

LATA No.: VB404.05

Validator: D.E. STROUP

Analyte	Analyte Concentration before Dilution	Analyte Concentration after Serial Dilution	%D
	I	S	
Barium (B0GFD7L)	145.86	146.02	0.1%
Chromium (B0GFD7L)	169.65	173.98	2.6%
Barium (B0GFD8L)	141.15	139.93	0.9%
Chromium (B0GFD8L)	158.17	148.13	6.3%

LATA INORGANIC (METALS)
DATA VALIDATION CHECKLIST

INORGANICS RESULTS CALCULATION, WATER

SDG: LK5106-LAS Date: 27-Oct-95

LATA No.: VB404.05 Validator: D.E. STROUP

Analyte	Concentration from curve		Dilution Factor	Concentration (µg/L)
	CONCW	units	DFW	
Calcium (B0GFD7)	122000.00	ug/L	1	122000.0
Potassium (B0GFD7	7845.00	ug/L	1	7845.0
Calcium (B0GFD8)	124000.00	ug/L	1	124000.0
Lead (B0GFD8)	65.00	ug/L	1	65.0

Laboratory Case Narrative

CASE NARRATIVE
INORGANIC METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- One water sample for total metals analysis. The sample was prepared as LAS Batch 811BHT and analyzed for selected analytes as requested on the chain of custody. Sample B0GFD7 (L5106-2) was used for matrix spike and duplicate and serial dilution. All data flags due to the performance of the above-mentioned QC are also associated with every sample digested with this batch.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times.

Internal Quality Control

- All internal quality control were within acceptance limits with the following exceptions:

  For lead, the LCSW (121.1%) recovered slightly above the acceptance criteria (80-120%). No lead was detected in the sample, therefore the positive bias observed does not affect the result. No corrective action was taken.

Sample Results

- The following qualifiers are reported on the basis of the techniques employed to perform the analyses:

  "P" ICP-AES

Nalini Prabhakar — Prepared By

09/08/95 — Date

10-27-95

0007

CASE NARRATIVE
INORGANIC METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- One filtered water sample was analyzed for dissolved metals analysis. As the measured turbidity of the sample was less than 1 NTU, it was batched as LAS batch 811BHD for dissolved metals analysis. Sample B0GFD8 (L5106-13) was used for matrix spike, duplicate and serial dilution analyses. All data flags due to the performance of the above-mentioned QC sample are also associated with every sample analyzed with this batch.

Holding Time Requirements

- All samples were analyzed within the method-specific holding times.

Method Blanks

- The level of analytes in the method blanks were less than the reporting detection limits.

Internal Quality Control

All internal quality control were within acceptance limits with the following exceptions:

- In the analysis of calcium, the percent difference of serial dilution slightly exceeded 10% the control limit. This may be due to physical interferences. Calcium results for the associated sample is flagged with an "E".

Sample Results

- The following qualifiers are reported on the basis of the techniques employed to perform the analyses:
"P" ICP-AES

Nalini Prabhakar
Prepared By

09/08/95
Date

10-27-95

0008

Chain-of-Custody Information

Bechtel Hanford, Inc.	L5106 CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	Page 1 of 1

Collector: K.D Lee	Company Contact: R. E. Peterson	Telephone: (509) 372-9638	Data Turnaround: ☐ Priority ■ Normal
Project Designation: 100-HR-3 Groundwater Sampling, Round 9, Phase 2	Sampling Location: 100 D	SAF No.: B95-068	
Ice Chest No.: PATTON	Field Logbook No.: EFL-1018	Method of Shipment: Federal Express	
Shipped To: Lockheed	Offsite Property No.: ~~NA~~ [illegible] 8-10-95 W95-0-0204-46	Bill of Lading/Air Bill No.: ~~NA~~ [illegible] 8-10-95 2904637303	

Possible Sample Hazards/Remarks												
			Preservation	HNO_3	Cool 4°C	H_2SO_4	*1	H_2SO_4	HNO_3	Cool 4°C	Cool 4°C		HNO_3
			Type of Container	G	G	P/G	P	P/G	P/G	G	P/G		G
			No. of Container(s)	1	1	1	1	1	5	1	1		1
Special Handling and/or Storage: Maintain samples between 2°C and 6°C.			Volume	500mL	500mL	500mL	1L	1L	1L	500mL	20mL		500mL
SAMPLE ANALYSIS				ICP Metals (Unfiltered)	Anions (IC) - F, Cl, SO_4, NO_2, NO_3, PO_4	NO_2 - NO_3	Sulfide	Ammonia	Gross Alpha, Gross Beta, Sr-90	Tritium	Activity Scan		ICP Metals (Filtered)
Sample No.	Matrix*	Date Sampled	Time Sampled										
B0GFD7	W	8/9/95	1135	X	X	X	X	X	X	X	X		
B0GFD8	W	8/9/95	1135										X

CHAIN OF POSSESSION	Sign/Print Names				
Relinquished By: [signature] K.D Lee	Date/Time: 8/10/95 0730	Received By: [signature] B.Whitten [illegible]	Date/Time: 8-10-95 0730
Relinquished By: [signature] B.Whitten [illegible]	Date/Time: 8-10-95 0830	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS

*1 ZnAc+NaOH

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0; and turbidity by EPA 180.1 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all samples listed on this chain of custody.

Matrix*
S = Soil
SE = Sediment
SO = Solid
SL = Sludge
W = Water
O = Oil
A = Air
DS = Drum Solids
DL = Drum Liquids
T = Tissue
WI = Wipe
L = Liquid
V = Vegetation
X = Other

LABORATORY SECTION	Received By: [signature]	Title: Sample Custodian [uncertain reading]	Date/Time: 8-11-95 0900 [uncertain reading]
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

END OF PACKAGE

DATA VALIDATION REPORT
for
100-HR-3 GROUNDWATER ROUND 9
PHASE II
General Chemistry Analysis
SDG LK5106-LAS
LATA VB404.05

Bechtel Hanford Inc.
P.O. Box 969
Richland, Washington

November 10, 1995

Table of Contents

100-HR-3 GROUNDWATER ROUND 9 PHASE II
Data Validation Narrative

INTRODUCTION

All samples in Sample Delivery Group (SDG) LK5106-LAS (VB404.04) were validated at level D as defined in the Data Validation Procedures for Chemical Analysis (WHC-SD-EN-SPP-002, Rev. 2).

The analyses were performed by Lockheed Analytical Services.

ANALYSES REQUESTED

See Table 1.

DATA QUALITY OBJECTIVES

Precision:	Goals for precision were met.
Accuracy:	Goals for accuracy were met with the exception of those items discussed in the **"Qualification Summary Table"**.
Sample Result Verification:	All sample results were supported in the raw data.
Detection Limits:	Detection limit goals were met for all sample results as specified in the *RCRA Facility Investigation/Corrective Measures Study Plan for the 100-HR-3 Operable Unit*, DOE/RL-88-36, Rev.0.
Completeness:	The data package was 78% complete for all requested analyses.

MAJOR DEFICIENCIES

Major deficiencies were identified during validation which required qualification of data as unusable. See the "**Qualification Summary Table**".

MINOR DEFICIENCIES

Minor deficiencies were identified during validation which required qualification of data as estimated. See the "**Qualification Summary Table**".

Table 1
Chain-of-Custody
Analysis Request

LATA ID #: VB404.05 SDG: LK5106-LAS

Sample Information					Analyses Requested			
SAMPLE NO.	DATE COLLECTED	MATRIX	SAF	FIELD QC INFO	1	2	3	4
B0GFD7	9-Aug-95	WATER	B95-068	Split of B0GFB1	X	X	X	X

Method References:

	Analysis	Method
1.	Anions (Cl,F,NO_2,NO_3,PO_4,SO_4)	300.0
2.	Ammonia	350.1
3.	NO2+N03	353.2
4.	Sulfide	9030

REFERENCES

WHC 1993, *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, Richland, Washington.

DOE 1992, RCRA Facility Investigation/Corrective Measures Study Plan for the 100-HR-3 Operable Unit, DOE/RL-88-36, Rev.0, Department of Energy-Hanford, Richland, Washington.

GLOSSARY OF VALIDATION APPLIED QUALIFIERS (CHEMISTRY)

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows.

U- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.

UJ- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during data validation, the associated quantitation limit is an estimate.

J- Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision making purposes.

BJ- Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.

R- Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency the data are unusable.

UR- Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data are unusable due to an identified QC deficiency.

GLOSSARY OF LABORATORY APPLIED QUALIFIERS

Qualifiers which may be applied by the laboratory in compliance with applicable requirements are as follows.

Commonly used laboratory general chemistry qualifiers:

U- Indicates the analyte was analyzed for but not detected in the sample.

H- Sample analysis performed outside of method-or client specified maximum holding time requirement.

D- Presence of high levels of interfering constituents required dilution of sample which increased the RDL by the dilution factor.

a- The spike recovery and/or RPD for matrix spike duplicates cannot be evaluated due to insufficient spiking level compared to the elevated sample analyte concentration.

Qualification Summary Table

Qualification Summary Table

General Chemistry

ANALYTE	TYPE	QUALIFIER	SAMPLES AFFECTED	DQO	REASON
Nitrite	MAJOR	UR	B0GFD7	HOLD TIME	Holding time is exceeded by greater than 2 times.
Ortho Phosphate	MAJOR	UR	B0GFD7	HOLD TIME	Holding time is exceeded by greater than 2 times.
Nitrate	MINOR	J	B0GFD7	HOLD TIME	Holding time is exceeded by greater than 2 times.
Sulfide	MINOR	UJ	B0GFD7	ACCURACY	Laboratory control standard recovery is outside acceptance criteria.

Comments:

1. The laboratory case narrative stated that all quality control samples results were acceptable, however, the sulfide LCS was outside acceptance limits.
2. The field split RPD values will be evaluated in SDG # W0663-QES, (LATA ID # VB404.07).

Data Summary Table

GENERAL CHEMISTRY
DATA SUMMARY TABLE

LATA ID#: VB404.05		HEIS #:	B0GFD7	
		Date:	9-Aug-95	
		Matrix:	WATER	
Constituent	CAS #	Units	Results	Q
Chloride by IC	16887-00-6	mg/L	27	
Fluoride by IC	16984-48-8	mg/L	0.001	U
Sulfate by IC	14808-79-8	mg/L	130	
Nitrate by IC	14797-55-8	mg/L	35	J
Nitrite by IC	14797-655-0	mg/L	0.002	UR
Nitrite+Nitrate	NO_2+NO_3-N	mg/L	35	
Ortho Phosphate by IC	14265-44-2	mg/L	0.020	UR
Ammonia Nitrogen	7664-41-7	mg/L	0.46	
Sulfide	18496-25-8	mg/L	1.0	UJ

Shaded areas indicate changes by the validator.

Sample Results (Form I's)

LOCKHEED ANALYTICAL SERVICES

Sample Results

Client Sample ID: B0GFD7	Date Collected: 09-AUG-95
Matrix: Water	Date Received: 11-AUG-95
Percent Solids: N/A	

Constituent	Units	Method	Result	Project Reporting Limit	Data Qualifier(s)	Date Analyzed	LAS Batch ID	LAS Sample ID
Chloride	mg/L	300.0	27.	0.020		14-AUG-95	26209	L5106-3
Fluoride	mg/L	300.0	< 0.001	0.10	U	05-SEP-95	26210	L5106-3
Nitrate-N	mg/L	300.0	35.	0.020	~~H~~ J	14-AUG-95	26211	L5106-3
Nitrite-N	mg/L	300.0	< 0.002	0.010	~~HU~~ UR	14-AUG-95	26212	L5106-3
Ortho Phosphate	mg/L	300.0	< 0.020	0.10	~~HU~~ UR	14-AUG-95	26213	L5106-3
Sulfate	mg/L	300.0	130	0.10		14-AUG-95	26214	L5106-3
Ammonia Nitrogen	mg/L	350.1	0.46	0.050		16-AUG-95	26215	L5106-6
Nitrate-Nitrite-Nitrogen	mg/L	353.2	35.	0.50	D(1:10)	18-AUG-95	26217	L5106-4
Sulfide	mg/L	9030	< 1.0	3.0	~~U~~ UJ	15-AUG-95	26249	L5106-5

bjs 10-17-95 0023

Checklist

LATA GENERAL CHEMISTRY
DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
VALIDATION PROCEDURE:	☐ WHC-CM-5-3, Rev. 0			☒ WHC-SD-EN-SPP-002, Rev. 2	

PROJECT:	100-HR-3 ROUND 6		SDG:	LK5106-LAS	
VALIDATOR:	BJ SEYMOUR 11-9-95	LATA NO:	VB404.05	DATE:	17-Oct-95
REVIEWER:	BJ MORRIS BJM 11-9-95	LAB:	LAS	CASE:	N/A
SAF NO:	B95-068	QAPP NO:	DOE/RL-88-36, Rev. 0	SAP NO:	N/A

ANALYSES REQUESTED

☒ Anions 300.0	☒ Ammonia 350.1	☒ Nitrate+Nitrite 353.2	☒ Sulfide 9030

SAMPLE NO.	MATRIX
B0GFD7	WATER

COMMENTS:

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

	YES	NO	N/A
Is technical verification documentation present?	☒	☐	☐
Is a case narrative present?	☒	☐	☐

2. HOLDING TIMES

	YES	NO	N/A
Are sample holding times acceptable?	☐	☒	☐

See HOLDING TIME SUMMARY form

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

	YES	NO	N/A
Were initial calibrations performed on all instruments?	☒	☐	☐
Are initial calibrations acceptable?	☒	☐	☐
Were calibration checks performed on all instruments?	☒	☐	☐
Are calibration checks acceptable?	☒	☐	☐
Validation calculation checks were performed and are acceptable.	☒	☐	☐

If NO(s) are checked, see CALIBRATION DATA SUMMARY form

LATA GENERAL CHEMISTRY
DATA VALIDATION CHECKLIST

4. BLANKS	YES	NO	N/A
Were laboratory blanks performed for all applicable analyses?	X		
Are laboratory blank results acceptable?	X		
Were preparation blanks analyzed?	X		
Are preparation blank results acceptable?	X		

If NO(s) are checked, see BLANK AND SAMPLE DATA SUMMARY form

5. ACCURACY	YES	NO	N/A
Were spike samples analyzed at the proper frequency?	X		
Are all spike sample recoveries acceptable?	X		
Were laboratory control samples (LCS) analyzed at the proper frequency?	X		
Are all LCS recoveries acceptable?		X	
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see ACCURACY DATA SUMMARY form

6. PRECISION	YES	NO	N/A
Were laboratory duplicates analyzed at the proper frequency?	X		
Are all duplicate RPD values acceptable?	X		
Were MS/MSDs analyzed?			X
Are all MS/MSD RPD values acceptable?			X
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see PRECISION DATA SUMMARY form

7. FIELD QC SAMPLES	YES	NO	N/A
Were field QC samples (field/trip blanks, duplicates, splits, performance audit) identified?	X		
Are field/trip blank results acceptable? (see Blank Data Summary form)			X
Are field duplicate RPD values acceptable? (see Field QC calculations)			X
Are field split RPD values acceptable? (see Field QC calculations)			X
Are performance audit sample results acceptable?			X

Comments: Sample B0GFD7 is identified as a split of B0GFB1

The split is evaluated in SDG: W0663-QES (LATA ID 404.07).

8. ANALYTE QUANTITATION	YES	NO	N/A
Was analyte quantitation performed properly?	X		
Are results calculated properly?	X		
Validation calculation checks were performed and are acceptable.	X		

Comments:

9. REPORTED RESULTS AND DETECTION LIMITS	YES	NO	N/A
Are results reported for all requested analyses?	X		
Are all results supported in the raw data?	X		
Do results meet the CRDLs?	X		
Validation calculation checks were performed and are acceptable.	X		

Comments:

VALIDATION SUMMARY

For deficiencies (major and minor) and comments, please refer to the Qualification Summary Table.

LATA GENERAL CHEMISTRY
DATA VALIDATION CHECKLIST

HOLDING TIME SUMMARY

SDG:	LK5106-LAS		VALIDATOR: BJ SEYMOUR					DATE:	17-Oct-95	
PROJECT:	100-HR-3 ROUND 9		REVIEWER: BJ MORRIS					LATA NO.:	VB404.05	
HEIS-SN	MATRIX CODE	ANALYSIS	DATE COLLECTED	PREP DATE	ANALYSIS DATE	PREP HT (days)	*Required HT (days)*	ANALYSIS HT (days)	*Required HT (days)*	VAL Q
B0GFD7	WATER	Anions(Cl,SO_4)	9-Aug-95	N/A	14-Aug-95	N/A	***N/A***	5	***28***	NONE
B0GFD7	WATER	Fluoride	9-Aug-95	N/A	05-Sep-95	N/A	***N/A***	27	***28***	NONE
B0GFD7	WATER	Anions(NO_2,NO_3,PO_4)	9-Aug-95	N/A	14-Aug-95	N/A	***N/A***	5	***2***	J/UR
B0GFD7	WATER	Ammonia	9-Aug-95	N/A	16-Aug-95	N/A	***N/A***	7	***28***	NONE
B0GFD7	WATER	Nitrate+Nitrite	9-Aug-95	N/A	18-Aug-95	N/A	***N/A***	9	***28***	NONE
B0GFD7	WATER	Sulfide	9-Aug-95	N/A	15-Aug-95	N/A	***N/A***	6	***7***	NONE

LATA GENERAL CHEMISTRY
DATA VALIDATION CHECKLIST

ACCURACY DATA SUMMARY

SDG:	LK5106-LAS			VALIDATOR:	BJ SEYMOUR	DATE:	17-Oct-95	
PROJECT:	100-HR-3 ROUND 9			REVIEWER:	BJ MORRIS	LATA NO.:	VB404.05	
				PERCENT RECOVERY (%R)				
HEIS-SN	ANALYTE	RESULTS	Lab Q	Matrix Spike	Matrix Spike Duplicate	Laboratory Control Standard	SAMPLES AFFECTED	VAL Q
B0GFD7	Sulfide	<1.0				71.9%	B0GFD7	UJ

LOCKHEED ANALYTICAL LABORATORY
WATER QUALITY PARAMETERS
QUALITY CONTROL DATA SUMMARY

SDG:N/A	ANALYTE: TOTAL SULFIDE
LAL BATCH: 811-bh	UNITS: mg/L

LABORATORY CONTROL SAMPLES

LCS ID	ACCEPTANCE LIMITS (%R)	TRUE VALUE	FOUND VALUE	% RECOVERY
lcs	70-130	7.96	5.725	71.9

MATRIX SPIKE SAMPLES

CLIENT SAMPLE ID	ACCEPTANCE LIMITS (%R)	SPIKED SAMPLE RESULT	SAMPLE RESULT	SPIKE ADDED	% RECOVERY
B0GFD7	65-135	7.206	0.600 U	7.960	90.5

LABORATORY DUPLICATE SAMPLES

CLIENT SAMPLE ID	ACCEPTANCE LIMITS (%RPD)	SAMPLE VALUE	DUPLICATE VALUE	RPD
B0GFD7	20	0.600 U	0.600 U	b

FIELD DUPLICATE SAMPLES

CLIENT SAMPLE ID	CLIENT DUPLICATE SAMPLE ID	SAMPLE VALUE	DUPLICATE VALUE	RPD
N/A				

FIELD BLANK SAMPLES

CLIENT SAMPLE ID	ANALYSIS RESULT
N/A	

MATRIX BLANK SAMPLES

LAL SAMPLE ID	ANALYSIS RESULT
pb	0.600 U

BM 11-9-95

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

LINEAR REGRESSION ANALYSIS

SDG: LK5106-LAS Date: 17-Oct-95

LATA No.: VB404.05 Validator: BJ SEYMOUR

Analyte/Calibration Date: Chloride/ 8-14-95

Concentration x	Absorbance y
0.000	0
20.000	86956
50.000	97307
100.000	212596
1000.000	2009766
5000.000	11642168

r	r^2
0.9996	0.9992

slope	x intercept
2328.7286	23.6846

1/slope	y intercept
0.0004	-53243.732

LINEAR REGRESSION ANALYSIS

SDG: LK5106-LAS Date: 17-Oct-95

LATA No.: VB404.05 Validator: BJ SEYMOUR

Analyte/Calibration Date: Nitrate+Nitrite/ 8-18-95

Concentration x	Absorbance y
0.000	0
0.050	11
0.200	51
1.000	276
2.000	556
4.000	1095
8.010	2137

r	r^2
0.9999	0.9998

slope	x intercept
267.6658	-0.0216

1/slope	y intercept
0.0037	5.9170

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

LINEAR REGRESSION ANALYSIS

SDG: LK5106-LAS

Date: 17-Oct-95

LATA No.: VB404.05

Validator: BJ SEYMOUR

Analyte/Calibration Date: Ammonia/ 8-16-95

Concentration	Absorbance
x	y
0.0000	0
0.0499	29
0.0992	50
0.4	175
1.6	722
6.4	3063

r	r^2
0.9999	0.9998

slope	x intercept
478.5557	0.0185

1/slope	y intercept
0.0021	-8.703

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

PERCENT RECOVERY (ICV/CCV)

SDG: LK5106-LAS Date: 17-Oct-95

LATA No.: VB404.05 Validator: BJ SEYMOUR

Analyte	Sample ID	Observed Value	True Value	%R
		O	A	
Chloride	ICV	994.558	1000	99%
Chloride	CCV	934.571	1000	93%
Ammonia	ICV	1.168	1.2	97.3%
Ammonia	CCV	1.615	1.600	100.9%
Nitrate+Nitrite	ICV	2.972	3.000	99.1%
Nitrate+Nitrite	CCV	3.994	4.000	99.9%
Sulfide	ICV	10.858	11.34	95.7%
Sulfide	CCV	18.755	19.90	94.2%

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

MATRIX SPIKE RECOVERY (MS)

SDG: LK5106-LAS Date: 17-Oct-95

LATA No.: VB404.05 Validator: BJ SEYMOUR

Analyte	Sample ID	Spike Sample Result	Sample Result	Spike Added	%R
		SSR	SR	SA	
Chloride	B0GFD7	68.98	27.107	40.00	105%
Ammonia	B0GFD7	4.847	0.455	4.00	109.8%
Nitrate+Nitrite	B0GFD7	39.301	35.162	4.00	103.5%
Sulfide	B0GFD7	7.206	0.000	7.960	90.5%

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

PERCENT RECOVERY (LCS)

SDG: LK5106-LAS

Date: 17-Oct-95

LATA No.: VB404.05

Validator: BJ SEYMOUR

Analyte	Observed value	True value	%R
	OLCS	ALCS	
Chloride	1019.943	1000.00	102%
Ammonia	4.246	4	106.2%
Nitrate+Nitrite	3.971	4	99.3%
Sulfide	5.725	7.96	71.9%

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

RELATIVE PERCENT DIFFERENCE

SDG: LK5106-LAS Date: 17-Oct-95

LATA No.: VB404.05 Validator: BJ SEYMOUR

Analyte	Sample ID	Original (Sample) concentration	Duplicate concentration	RPD
		OS	D	
Chloride	B0GFD7	27.107	27.257	1%
Ammonia	B0GFD7	0.455	0.495	8.4%
Nitrate+Nitrite	B0GFD7	35.162	35.236	0.2%
Sulfide	B0GFD7	0.600	0.600	0.0%

LATA GENERAL CHEMISTRY
CALCULATION SPREADSHEET

RESULTS CALCULATION, WATER

SDG: LK5106-LAS Date: 17-Oct-95

LATA No.: VB404.05 Validator: BJ SEYMOUR

Analyte	Concentration from curve		Dilution Factor	Concentration (µg/L)
	CONCW	units	DFW	
Chloride (B0GFD7)	27.107	mg/L	1	27
Ammonia (B0GFD7)	0.455	mg/L	1	0.46
Nitrate+Nitrite (B0GFD7)	35.162	mg/L	1	35
Sulfide (B0GFD7)	0.197	mg/L	1	<1.0

Laboratory Case Narrative

CASE NARRATIVE
INORGANIC NON METALS ANALYSES

The routine calibration and quality control analyses performed for this batch include as applicable: instrument tune (ICP/MS only), initial and continuing calibration verification, initial and continuing calibration blanks, method blank(s), laboratory control sample(s), ICP interference check samples (ICP only), serial dilutions, analytical (post-digestion) spike samples, matrix spike (predigestion) sample(s), duplicate sample(s).

Preparation and Analysis Requirements

- One water sample was received for LK5106 and analyzed in batch 811 bh for selected analytes as requested on the chain of custody. Quality control analysis was performed on the following sample:

Client ID	LAL #		Method
BOGFD7	L5106-3	MS, DUP	300.0 Chloride, Fluoride, Nitrate-Nitrogen, Nitrite-Nitrogen, Orthophosphate, Sulfate
	L5106-6	MS, DUP	350.1 Ammonia
	L5106-4	MS, DUP	353.2 Nitrate-Nitrite-Nitrogen
	L5106-5	MS, DUP	9030 Sulfide

Holding Time Requirements

- All samples were analyzed within the method-specific holding time with the exception of Method 300.0 Nitrate-Nitrogen, Nitrite-Nitrogen and Orthophosphate which were received outside of holding time. The associated samples are flagged with an "H".

Method Blanks

- The concentration levels of all the requested analytes in the method blank were below the reporting detection limits.

Internal Quality Control

- All Internal Quality Control were within acceptance limits.

Kay McCann
Prepared By

September 12, 1995
Date

bi> 10-17-95

0006

Chain-of-Custody Information

Bechtel Hanford, Inc.

L5106 CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Page 1 of 1

Date Turnaround: ☐ Priority ■ Normal

Collector: K. D Lee	Company Contact: R. E. Peterson	Telephone: (509) 372-9638
Project Designation: 100-HR-3 Groundwater Sampling, Round 9, Phase 2	Sampling Location: 100 D	SAF No.: B95-068
Ice Chest No.: PATTON	Field Logbook No.: EFL-1018	Method of Shipment: Federal Express
Shipped To: Lockheed	Offsite Property No.: ~~NA~~ BW 8-10-95 W95-0-0209-46	Bill of Lading/Air Bill No.: ~~NA~~ BW 8-10-95 2904637303
Possible Sample Hazards/Remarks		

Preservation	HNO_3	Cool 4°C	H_2SO_4	*1	H_2SO_4	HNO_3	Cool 4°C	Cool 4°C		HNO_3
Type of Container	G	G	P/G	P	P/G	P/G	G	P/G		G
No. of Container(s)	1	1	1	1	1	5	1	1		1
Volume	500mL	500mL	500mL	1L	1L	1L	500mL	20mL		500mL
SAMPLE ANALYSIS	ICP Metals (Unfiltered)	Anions (IC) - F, Cl, SO_4, NO_2, NO_3, PO_4	NO_2 - NO_3	Sulfide	Ammonia	Gross Alpha, Gross Beta, Sr-90	Tritium	Activity Scan		ICP Metals (Filtered)

Sample No.	Matrix*	Date Sampled	Time Sampled									
B0GFD7	W	8/9/95	1135	X	X	X	X	X	X	X	X	
B0GFD8	W	8/9/95	1135									X

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By: K D Lee	Date/Time: 8/10/95 0730	Received By: ERC B. Whitten Date/Time: 8-10-95 0730
Relinquished By: ERC Kurt Whitten B Whitten	Date/Time: 8-10-95 0830	Received By: Date/Time:
Relinquished By:	Date/Time:	Received By: Date/Time:
Relinquished By:	Date/Time:	Received By: Date/Time:

SPECIAL INSTRUCTIONS

*1 ZnAc + NaOH

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0; and turbidity by EPA 180.1 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all samples listed on this chain of custody.

Matrix*
- S = Soil
- SE = Sediment
- SO = Solid
- SL = Sludge
- W = Water
- O = Oil
- A = Air
- DS = Drum Solids
- DL = Drum Liquids
- T = Tissue
- WI = Wipe
- L = Liquid
- V = Vegetation
- X = Other

LABORATORY SECTION	Received By:	Title: Sample Custodian	Date/Time: 8-11-95 0730
FINAL SAMPLE DISPOSITION	Disposal Method:	Disposed By:	Date/Time:

000080

Supplemental Information

LATA GENERAL CHEMISTRY
DATA VALIDATION CHECKLIST

INFORMATION REQUEST FORM (IRF)

To: Jeanette Duncan, WHC/BHI Date: 17-Oct-95

Primary FAX: 372-~~2186~~ 9052 Secondary FAX: 372-1616

PROJECT NAME:	100-HR-3 ROUND 9
SDG NUMBER:	LK5106-LAS
LATA NO.:	VB404.05
LABORATORY:	LAS
CASE NUMBER:	N/A
ANALYSIS METHOD:	Chloride, Nitrate, Nitrite, Sulfate
ANALYSIS DATE:	8/14/95
ITEM(S) MISSING:	Raw Data for injection #15 (ICB) and injection# 22 (L5106-3)

Comments: This information is necessary to complete validation.
Thankyou

RETURN TO LATA

Attention: BJ SEYMOUR

INFORMATION RECEIVED FROM WHC (INITIALS/DATE): bjs 10-31-95

INFORMATION ACCEPTABLE?: YES [X] NO [ ]

If NO is checked, send a new LIRF to request additional information.

LOCKHEED ANALYTICAL LABORATORY
ANIONS BY ION CHROMATOGRAPHY
METHOD 300.0/LAL-90-SOP-0019

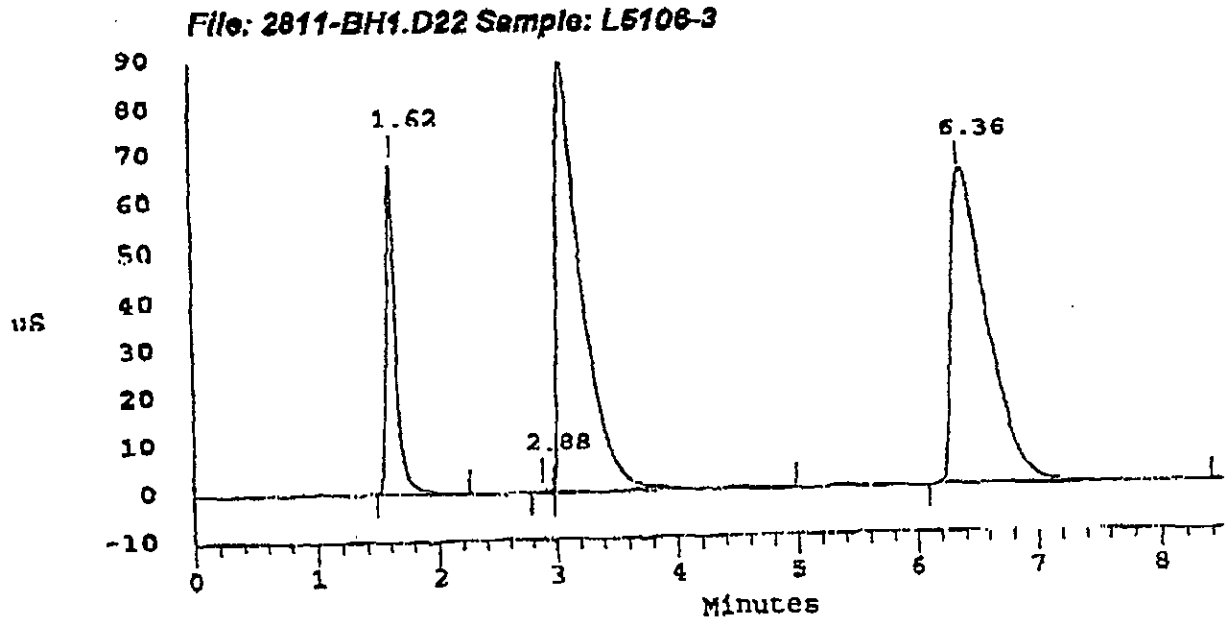
Data Reprocessed On 10/30/1995 13:22:13

Sample Name: L5106-3		Date: 08/14/1995 12:42:48	
Data File : C:\ARCHIVE\AUGARC\081495\2811-BH1.D22			
Method : C:\DX\METHOD\ANIONSH2.MET			
ACI Address: 1 System: 2 Inject#: 22			Detector:CDM-2
Analyst :	Column:		

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2550	5Hz	0.00	8.50	100000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/L	Area	Height
1	1.62	CHLORIDE	27.107	372924634	68330012
0	0.00	NITRITE-NITROGEN	0.000	0	0
3	3.06	NITRATE-NITROGEN	35.228	1298196241	89955516
4	6.36	SULFATE	134.885	1379453750	64862742
		Totals	197.220	3050574625	223148269



000033

ANIONS BY ION CHROMATOGRAPHY
METHOD 300.0/LAL-90-SOP-0019

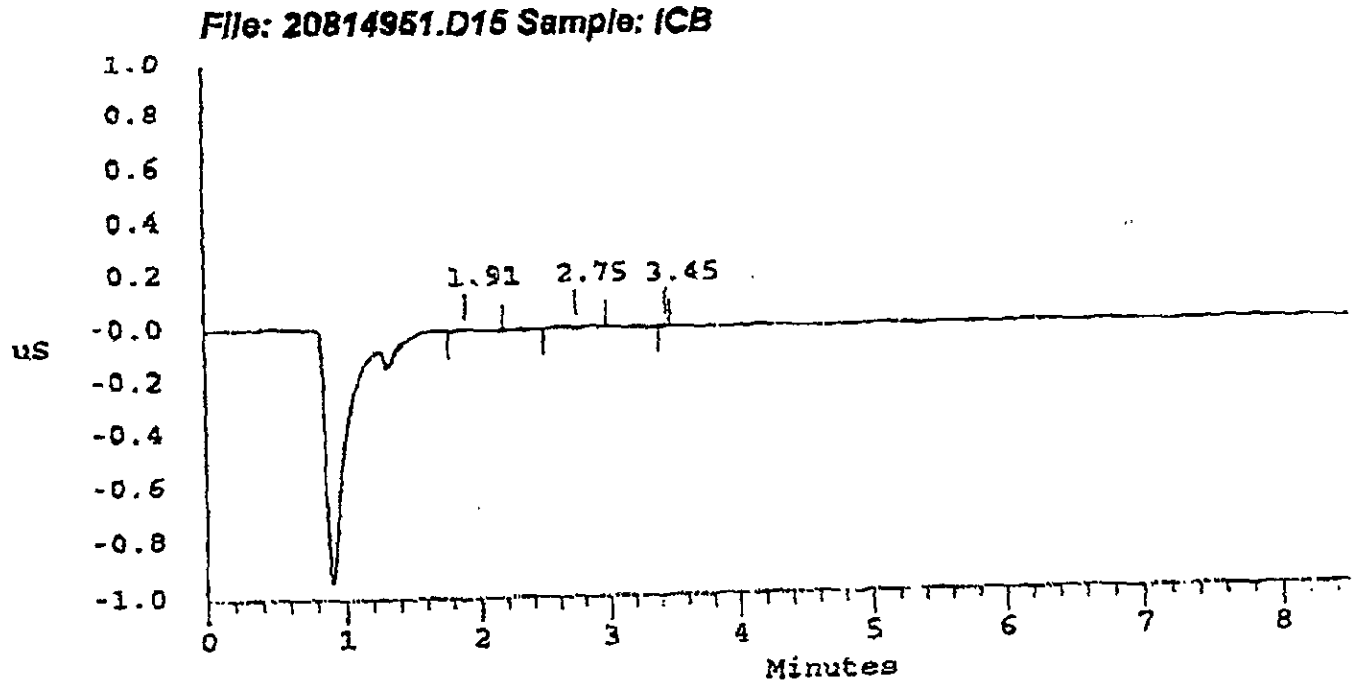
Data Reprocessed On 10/30/1995 13:20:51

Sample Name: ICB		Date: 08/14/1995 10:25:14	
Data File : C:\ARCHIVE\CALCURV\95-226\20814951.D15			
Method : C:\DX\METHOD\ANIONSL2.MET			
ACI Address: 1 System: 2 Inject#: 15			Detector:CDM-2
Analyst :	Column:		

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2550	SHz	0.00	8.50	20000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration µg/L	Area	Height
0	0.00	CHLORIDE	0.000	0	0
1	1.91	NITRITE-NITROGEN	2.108	41532	3915
0	0.00	NITRATE-NITROGEN	0.000	0	0
0	0.00	SULFATE	0.000	0	0
		Totals	2.108	41532	3915



000034

END OF PACKAGE

DATA VALIDATION REPORT
for
100-HR-3 GROUNDWATER ROUND 9
PHASE II
Radiochemistry Analysis
SDG LK5106-LAS
LATA VB404.05

Bechtel Hanford Inc.
P.O. Box 969
Richland, Washington

November 10, 1995

Table of Contents

100-HR-3 GROUNDWATER ROUND 9 PHASE II
Data Validation Narrative

INTRODUCTION

All samples in Sample Delivery Group (SDG) LK5106-LAS (VB404.05) were validated at level D as defined in the Data Validation Procedures for Radiochemical Analyses (WHC-SD-EN-SPP-001, Rev. 1)

The analyses were performed by Lockheed Analytical Services.

ANALYSES REQUESTED

See Table 1.

DATA QUALITY OBJECTIVES

Precision: Goals for precision were met.

Accuracy: Goals for accuracy were met.

Sample Result Verification: All sample results were supported in the raw data.

Detection Limits: Detection limit goals were met for all sample results as specified in the *RCRA Facility Investigative/Corrective Measures Study Work Plan for the 100-HR-3 Operable Unit,* DOE/RL-88-36, Rev. 0.

Completeness: The data package was 100% complete for all requested analyses.

MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

MINOR DEFICIENCIES

No minor deficiencies were identified during data validation which required qualification of data as estimated.

Table 1
Chain-of-Custody
Analysis Request

LATA ID #: VB404.05 SDG: LK5106-LAS

Sample Information				Analyses Requested					
SAMPLE NO.	DATE COLLECTED	MATRIX	FIELD QC INFO	1	2	3	4	5	6
B0GFD7	9-Aug-95	WATER	Split of B0GFB1	X	X	X	X	X	X

Method References:

	Analysis	Method
1.	Gross Alpha	LAL-91-SOP-0060
2.	Gross Beta	LAL-91-SOP-0060
3.	Total Strontium	LAL-91-SOP-0196
4.	Tritium	LAL-91-SOP-0066
5.	Activity Scan	Lab Specific
6.	Rad Screen	Lab Specific

NOTES: (complete documentation of these notes can be found in the Supplemental Information Section of this report)

NOTE 1:

The rad screen was deemed unnecessary prior to off-site shipment.

REFERENCES

WHC 1993, *Data Validation Procedures for Radiochemical Analyses*, WHC-SD-EN-SPP-001, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

DOE 1992, *RCRA Facility Investigation/Corrective Measures Study Plan for the 100-HR-3 Operable Unit*, DOE/RL-88-36, Rev. 0, Department of Energy-Hanford, Richland, Washington.

GLOSSARY OF VALIDATION APPLIED QUALIFIERS (RADIOCHEMISTRY)

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows.

U- Indicates the constituent was analyzed for, but was not detected at a concentration above the Minimum Detectable Activity (MDA). The concentration reported is the sample result corrected for sample aliquot size, dilution factors, and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ- Indicates the constituent was analyzed for and was not detected at a concentration above the Minimum Detectable Activity (MDA). Due to a quality control deficiency identified during data validation, the result reported may not accurately reflect the sample concentration. The associated data should be considered usable for decision making purposes.

J- Indicates a constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during validation. The data should be considered usable for decision making purposes.

R- Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision making purposes.

UR- Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision making purposes.

GLOSSARY OF LABORATORY APPLIED QUALIFIERS

Qualifiers which may be applied by the laboratory in compliance with applicable requirements are as follows.
Commonly used laboratory radiochemistry qualifiers:

U- Indicates the analyte was analyzed for but not detected in the sample.

J- Indicates the value reported is estimated due to the presence of interference.

C- Indicates the presence of high Total Dissolved Solids in the sample required reduction of sample size which increased the MDA.

Qualification Summary Table

Qualification Summary Table

Radiochemistry

ANALYTE	TYPE	QUALIFIER	SAMPLES AFFECTED	DQO	REASON
No qualifiers were assigned by the validator.					

Comments:

1. The field split RPD values will be evaluated in SDG # W0663-QES, LATA ID VB404.07.
2. The MDA for the Gross Alpha analysis is greater than the RDL .

Data Summary Table

RADIOCHEMISTRY
DATA SUMMARY TABLE

LATA ID#: VB404.05		HEIS #:	B0GFD7	
		Date:	9-Aug-95	
		Matrix:	WATER	
Constituent	CAS #	Units	Results	Q
Gross Alpha	ALPHA	pCi/L	3.7	
Gross Beta	BETA	pCi/L	11.3	
Strontium-90	10098-97-2	pCi/L	4.37	
Tritium	10028-17-8	pCi/L	3680	

Shaded areas indicate changes by the validator.

Sample Results (Form I's)

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0GFD7 — LAL Sample ID: L5106-7

Date Collected: 09-AUG-95 — Date Received: 11-AUG-95

Matrix: Water — Login Number: L5106

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
Gross Alpha	23-AUG-95	GR ALP/BETA LAL-0060_26272	3.7	2.6	3.5	C	pCi/L
Gross Beta	23-AUG-95	GR ALP/BETA LAL-0060_26272	11.3	2.7	3.4		pCi/L
Total radio-strontium	18-AUG-95	SR-90 LAL-0196_26273	4.37	0.63	0.72		pCi/L

AJ 10-18-95

LOCKHEED ANALYTICAL SERVICES

RAD DATA REPORT (ra01)

Bechtel Hanford, Inc. * Richland, WA

Bechtel Hanford Project (Project BECHTEL-HANFORD)

Client Sample ID: B0GFD7 LAL Sample ID: L5106-12

Date Collected: 09-AUG-95 Date Received: 11-AUG-95

Matrix: Water Login Number: L5106

Constituent	Analyzed	Batch	Activity	Error	MDA	DataQual	Units
H-3	24-AUG-95	TRITIUM(H3) LAL-0066_26274	3680	480	270		pCi/L

AJ 10-18-95

000013

0584

Checklist

LATA RADIOCHEMISTRY
DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E

VALIDATION PROCEDURE:	☐ WHC-CM-5-3, Rev. 0		☒ WHC-SD-EN-SPP-001, Rev. 1		
PROJECT:	100-HR-3 AJF 10-18-95		SDG:	LK5106-LAS	
VALIDATOR:	AM FREIER	LATA NO:	VB404.05	DATE:	18-Oct-95
REVIEWER:	BJ MORRIS BJM 11-9-95	LAB:	LAS	CASE:	N/A
SAF NO:	B95-068	QAPP NO:	DOE/RL-88-36, Rev. 0	SAP NO:	N/A

ANALYSES REQUESTED

☒ Gross Alpha/Beta LAL-91-SOP-0060	☒ Total Strontium LAL-91-SOP-0196	☒ Tritium LAL-91-SOP-0066	
SAMPLE NO.	MATRIX	COMMENTS:	
B0GFD7	WATER		

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE	YES	NO	N/A
Is technical verification documentation present?	☒	☐	☐
Is a case narrative present?	☒	☐	☐

2. HOLDING TIMES	YES	NO	N/A
Are sample holding times acceptable?	☒	☐	☐
Are samples preserved correctly?	☒	☐	☐

See HOLDING TIME SUMMARY form

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS	YES	NO	N/A
Were instruments/detectors calibrated within one year of sample analysis?	☐	☒	☐
Are initial calibrations acceptable?	☒	☐	☐
Are standards NIST traceable?	☒	☐	☐
Are standards acceptable?	☒	☐	☐

Comments: Calibration of instruments/detectors was not performed within one year of sample analysis, however continuing calibration data is acceptable. Therefore, no qualifiers are assigned.

4. CONTINUING CALIBRATION	YES	NO	N/A
Background checked at proper frequency?	X		
Background check acceptable?	X		
Efficiency checked at proper frequency?	X		
Efficiency check acceptable?	X		
Calibration check standards NIST traceable?	X		
Calibration check standards acceptable?	X		

If NO(s) are checked, see CALIBRATION DATA SUMMARY form

5. BLANKS	YES	NO	N/A
Were method blanks analyzed?	X		
Are the method blanks free of analytes?	X		
Were method blank results acceptable?	X		
Validation calculation/transcription checks were performed and are acceptable.	X		

If NO(s) are checked, see BLANK DATA SUMMARY form

6. ACCURACY	YES	NO	N/A
Were spike samples analyzed at the proper frequency?	X		
Are all spike sample recoveries acceptable?	X		
Were laboratory control standards (LCS) analyzed at the proper frequency?	X		
Are all LCS recoveries acceptable?	X		
Was a tracer/chemical carrier added?	X		
Was the tracer/chemical carrier recovery acceptable?	X		
Are standard sources traceable?	X		
Are standards acceptable?	X		
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see ACCURACY DATA SUMMARY form

7. PRECISION	YES	NO	N/A
Were laboratory duplicates analyzed at the proper frequency?	X		
Are all duplicate RPD values acceptable?	X		
Validation calculation checks were performed and are acceptable.	X		

If NO(s) are checked, see PRECISION DATA SUMMARY form

8. FIELD QC SAMPLES	YES	NO	N/A
Were field QC samples (field/trip blanks, duplicates, splits, performance audit) identified?	X		
Are field/trip blank results acceptable? (see Blank Data Summary form)			X
Are field duplicate RPD values acceptable? (see Field QC calculations)			X
Are field split RPD values acceptable? (see Field QC calculations)			X
Are performance audit sample results acceptable?			X

Comments: Sample BOGFD7 is a field split of B0GFB1.

The field split RPD values will be evaluated in SDG # W0663-QES, LATA ID VB404.07.

9. REPORTED RESULTS AND DETECTION LIMITS	YES	NO	N/A
Are results reported for all requested analyses?	X		
Are all results supported in the raw data?	X		
Are results calculated properly?	X		
Do MDAs meet the RDLs?		X	
Validation calculation checks were performed and are acceptable.	X		

Comments: The MDA for the Gross Alpha analysis is greater than the RDL .

VALIDATION SUMMARY

For deficiencies (major and minor) and comments, please refer to the Qualification Summary Table.

LATA RADIOCHEMISTRY
DATA VALIDATION CHECKLIST

HOLDING TIME SUMMARY

SDG: LK5106-LAS			VALIDATOR: AM FREIER					DATE: 18-Oct-95		
PROJECT: 100-HR-3			REVIEWER: BJ MORRIS					LATA NO.: VB404.05		
HEIS-SN	MATRIX CODE	ANALYSIS	DATE COLLECTED	PREP DATE	ANALYSIS DATE	PREP HT (days)	*Required HT (days)*	ANALYSIS HT (days)	*Required HT (days)*	VAL Q
B0GFD7	WATER	Gross Alpha/Beta	9-Aug-95	N/A	23-Aug-95	N/A	***N/A***	14	***180***	NONE
B0GFD7	WATER	Strontium	9-Aug-95	N/A	18-Aug-95	N/A	***N/A***	9	***180***	NONE
B0GFD7	WATER	Tritium	9-Aug-95	N/A	24-Aug-95	N/A	***N/A***	15	***180***	NONE

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

MATRIX SPIKE RECOVERY (MS)

SDG: LK5106-LAS

Date: 18-Oct-95

LATA No.: VB404.05

Validator: AM FREIER

Analyte	Sample ID	Spike Sample Result	Sample Result	Spike Added	%R
Gross Alpha	B0GFD7	46.2	3.71	48.8	87%
Gross Beta	B0GFD7	65	11.3	50.3	107%
Tritium	B0GFD7	6730	3680	3580	85%

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

PERCENT RECOVERY (LCS)

SDG: LK5106-LAS Date: 18-Oct-95

LATA No.: VB404.05 Validator: AM FREIER

Analyte	Observed value	True value	%R
Gross Alpha	44.6	39.2	114%
Gross Beta	42.4	42.5	100%
Strontium	47.7	51.8	92%
Tritium	2360	2260	104%

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

RELATIVE PERCENT DIFFERENCE

SDG: LK5106-LAS Date: 18-Oct-95

LATA No.: VB404.05 Validator: AM FREIER

Analyte	Sample ID	Original (Sample) concentration	Duplicate concentration	RPD
Gross Alpha	B0GFD7	3.71	1.86	66.4%
Gross Beta	B0GFD7	11.30	14.20	22.7%
Strontium	B0GFD7	4.37	3.14	32.8%
Tritium	B0GFD7	3680	3520	4.44%

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

MINIMUM DETECTABLE ACTIVITY (MDA)

SDG: LK5106-LAS

Date: 18-Oct-95

LATA No.: VB404.05

Validator: AM FREIER

Analyte	Sample ID	Bkgrnd counts/ min (cpm) or Std Dev of bkgrnd (cpm)	Count time for assoc. sample	Detector Efficiency	Ingrowth corr. factor	Tracer/ Carrier recovery factor	Decay factor	Chemical yield factor	Sample volume (L or g)	MDA
Gross Alpha	B0GFD7	0.04	100	0.09	1.00	1.00	1.00	1.00	0.165	3.46
Gross Beta	B0GFD7	1.01	100	0.40	1.00	1.00	1.00	1.00	0.17	3.40
Strontium	B0GFD7	0.98	200	0.45	1.00	0.90	1.00	1.00	0.50	0.72
Tritium	B0GFD7	0.90	20	0.18	1.00	1.00	1.00	1.00	0.01	279

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

RESULTS CALCULATION GROSS ALPHA/BETA AND TRITIUM

SDG: LK5106-LAS

Date: 18-Oct-95

LATA No.: VB404.05

Validator: AM FREIER

Analyte	Gross Counts per minute	Background Counts per minute	Activity of alpha fraction in beta channel	Detector Efficiency	Sample volume (L or g)	Result
Gross Alpha	0.16	0.04	1.00	0.09	0.17	3.72
Gross Beta	2.69	1.01	1.00	0.40	0.17	11.53
Tritium	16.03	0.90	1.00	0.18	0.01	3765.37

LATA RADIOCHEMISTRY
CALCULATION SPREADSHEET

RESULTS CALCULATION TOTAL STRONTIUM

SDG: LK5106-LAS

Date: 18-Oct-95

LATA No.: VB404.05

Validator: AM FREIER

Analyte	Gross Counts per minute	Background Counts per minute	Ingrowth correction Factor	Detector Efficiency	Carrier recovery factor	Strontium decay factor	Sample volume (L or g)	Result
Strontium-90	3.03	0.98	1.00	0.45	0.90	1.00	0.50	4.54

Laboratory Case Narrative

CASE NARRATIVE
RADIOCHEMICAL ANALYSES

The routine calibration and quality control (QC) analyses performed for this batch include as applicable: instrument calibration, initial and continuing calibration verification, quench monitoring standards, instrument background analysis, method blanks, yield tracer, laboratory control samples, matrix spike samples, duplicate samples.

NOTE: Chemical recoveries and minimum detectable activities can be found on the preparation sheets and calculation sheets on the attached raw data for each method.

Holding Time Requirements

All holding times were met.

Analytical Method Gross Alpha/Beta

The gross alpha/beta analysis was performed using standard operating procedure (SOP), LAL-91-SOP-0060. The samples were analyzed in workgroup 26272. No problems were encountered during analysis and all QC criteria were met. No re-analyses were performed.

Analytical Method Strontium-90

The strontium-90 analysis was performed using SOP, LAL-91-SOP-0196. The samples were analyzed in workgroup 26273. No problems were encountered during the analysis and all QC criteria were met with the following exceptions: The relative error recovery and relative percent difference were slightly out of QC criteria. Data quality is not adversely affected. No re-analyses were performed.

Analytical Method Tritium

The tritium analysis was performed using SOP, LAL-91-SOP-0066. The samples were analyzed in workgroup 26274. No problems were encountered during analysis and all QC criteria were met. No re-analyses were performed.

Andrea Tippett
Prepared By

August 26, 1995
Date

AT 10-18-95

Chain-of-Custody Information

Bechtel Hanford, Inc.

L5106 CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Data Turnaround: ☐ Priority ■ Normal

Collector: K. D Lee	Company Contact: R. E. Peterson	Telephone: (509) 372-9638
Project Designation: 100-HR-3 Groundwater Sampling, Round 9, Phase 2	Sampling Location: 100 D	SAF No.: B95-068
Ice Chest No.: PATTON	Field Logbook No.: EFL-1018	Method of Shipment: Federal Express
Shipped To: Lockheed	Offsite Property No.: ~~NA~~ BW 8-10-95 W95-0-0209-46	Bill of Lading/Air Bill No.: ~~NA~~ BW 8-10-95 2904637303

Possible Sample Hazards/Remarks	Preservation	HNO_3	Cool 4°C	H_2SO_4	*1	H_2SO_4	HNO_3	Cool 4°C	Cool 4°C		HNO_3
	Type of Container	G	G	P/G	P	P/G	P/G	G	P/G		G
	No. of Container(s)	1	1	1	1	1	5	1	1		1
Special Handling and/or Storage: Maintain samples between 2°C and 6°C.	Volume	500mL	500mL	500mL	1L	1L	1L	500mL	20mL		500mL
SAMPLE ANALYSIS		ICP Metals (Unfiltered)	Anions (IC) - F, Cl, SO_4, NO_2, NO_3, PO,	NO_2 - NO_3	Sulfide	Ammonia	Gross Alpha, Gross Beta, Sr-90	Tritium	Activity Scan		ICP Metals (Filtered)

Sample No.	Matrix*	Date Sampled	Time Sampled									
B0GFD7	W	8/9/95	1135	X	X	X	X	X	X	X	X	
B0GFD8	W	8/9/95	1135									X

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By: K D Lee	Date/Time: 8/10/95 0730	Received By: ERC B. Whitten	Date/Time: 8-10-95 0730
Relinquished By: ERC B Whitten	Date/Time: 8-10-95 0830	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

SPECIAL INSTRUCTIONS
*1 ZnAc+NaOH

Sample analysis for phosphate, nitrate, and nitrite by EPA 300.0; and turbidity by EPA 180.1 is being requested for information only. The ERC Contractor acknowledges that the 48-hour holding time will not be met.

The Activity Scan is for all samples listed on this chain of custody.

Matrix*
S = Soil
SE = Sediment
SO = Solid
SL = Sludge
W = Water
O = Oil
A = Air
DS = Drum Solids
DL = Drum Liquids
T = Tissue
WI = Wipe
L = Liquid
V = Vegetation
X = Other

LABORATORY SECTION	Received By: A M Miller	Title: Sample Custodian	Date/Time: 8-11-95 0730	
FINAL SAMPLE DISPOSITION	Disposal Method: 82000	Disposed By:	Date/Time:	

Lockheed Analytical Services
Sample Receiving Checklist

Client Name: Bechtel - Hanford Job No. L5106 Cooler ID:

COOLER CONDITION UPON RECEIPT			
Temperature of cooler upon receipt:	2°C		
temperature of temp. blank upon receipt:			
	Yes	**No**	*** Comments/Discrepancies**
custody seals intact	Y		
chain of custody present	Y		
blue ice (or equiv.) present/frozen	Y		
rad survey completed	Y		

SAMPLE CONDITION UPON RECEIPT			
	Yes	**No**	*** Comments/Discrepancies**
all bottles labeled	Y		
samples intact	Y		
proper container used for sample type	Y		
sample volume sufficient for analysis	Y		
proper pres. indicated on the COC	Y		
VOA's contain headspace			N/A
are samples bi-phasic (if so, indicate sample ID'S):			N/A

MISCELLANEOUS ITEMS			
	Yes	**No**	*** Comments/Discrepancies**
samples with short holding times		Y	
samples to subcontract		Y	

ADDITIONAL COMMENTS/DISCREPANCIES

Completed by / date: [signature] 8-11-95

Sent to the client (date/initials): ** Client's signature upon receipt:

*Notes: * = contact the appropriate CSR of any discrepancies immediately upon receipt*

*** = please review this information and return via facsimille to the appropriate CSR (702) 361-8146*

620000

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10-18-95

version 2.0 (11/11/94)

Supplemental Information

018046

Environmental Restoration Contractor **ERC Team**

Interoffice Memorandum

Job No. 22192
Written Response Required: NO
CCN: N/A
OU: 100-HR-3
TSD: N/A
ERA: N/A
Subject Code: 3830

TO: W. S. Thompson N3-06

DATE: July 26, 1995

COPIES: R. L. Biggerstaff H4-91

FROM: S. K. De Mers
Radiological Controls
T7-05/373-1913

SUBJECT: **1995 Phase 2, Round 9 sampling for 100-HR-3**

There is no need to perform total activities prior to offsite shipment to NRC licensed labs of samples taken from the attached list of wells.

All wells listed in the attachment were reviewed for radiological content based on the previous 4 years of sampling data. No well listed has a β activity in excess of 100,000 pCi/l (<.1 uCi/sample based on a 1 liter sample size) nor any α activity in excess of 10,000 pCi/l (<.01 uCi/l based on a 1 liter sample). All wells show activities < 2,000 pCi/gm (< 2 nCi/gm D.O.T. limit). The highest activity in recent samples is 73 pCi/l β and 10 pCi/l α.

Radiological monitoring during sampling will only be required if the wells are located in radiological areas or if the wells themselves are labeled with radiological stickers. Monitoring requirements for down hole work such as pump removal will be determined based on the history of each well on a case by case basis.

Copies: T. L. Lafreniere X0-23
K. F. Trapp ~~N3-05~~ N1-28

DELAYED DUE TO
INCORRECT MSIN
PLEASE NOTIFY SENDER

Attachment - 1995 Phase 2, Round 9 well list for 100 HR-3
skd

AJ 10-18-95

~~0016~~

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END OF PACKAGE